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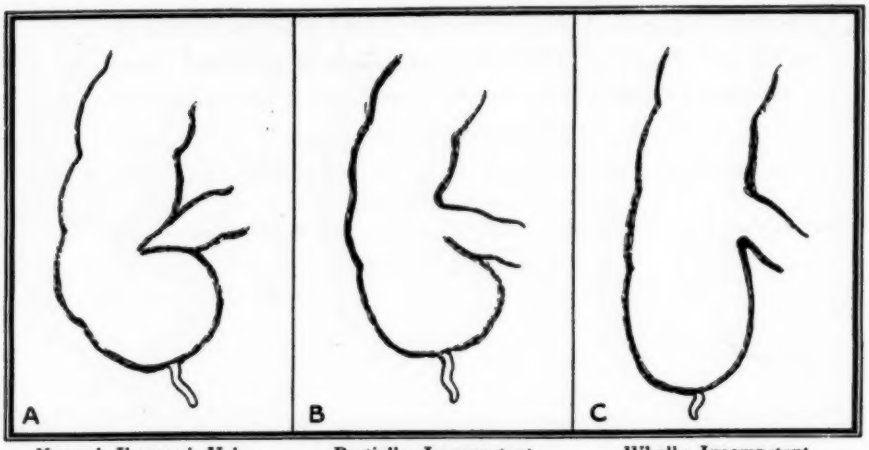

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What Color Music?

Hearing Colors and Seeing Sounds

ROBERT KINGMAN, A.M., M.D., F.A.C.P.

Brooklyn, N. Y.

Can you describe just how you feel and think when you appreciate music, painting and sculpture not simply as sound, color and form, but as art? Does appreciation of this sort imply the possession of faculties denied to the practical business man who decries all art as being too high-brow and impractical to deserve serious attention?

If it is true, as has been said, that all art is the attempt by artists to express through the medium of their various crafts the inexpressible, the difficulty of appreciation from which the average man is popularly believed to suffer, may be a very real one. For this would be equivalent to saying that lovers of art must be able to comprehend the incomprehensible.

However that may be, there are individuals who are in the habit of experiencing sensations that would be very confusing and even alarming to most of us. For instance, some people see noises and music and hear colors and odors. Geniuses of the literary world and in the field of music seem to have been peculiarly liable to this sort of thing, this confounding of the senses, both when in their cups and out. Guy de Maupassant wrote: "I really do not know sometimes whether I inhale music or hear perfumes." Leonard Hoffmann, a notable worshipper of Bacchus and a writer of droll tales, was accustomed to confound colors, odors and sounds and states in his biography that his five senses were so generally confused that he ordinarily heard colors and saw sounds. Théophile Gautier, in the celebrated account of his experiences with hashish, says: "My hearing became so acute that I heard the noise of colors; red, green, blue and yellow sounds came to my ears in waves, each one perfectly distinct from the others."

One musician states that the prelude to Lohengrün seems to him all green; another, that he hears a great deal of yellow in the music of Chopin, and still another finds that Mozart's music is generally blue while the Ride of the Valkyries is a grayish green. The peculiar effect of these sensory complexes on the mind is due to the fact that they are aroused by stimulating a receptive channel ordinarily associated in our minds with an entirely different end-result. When we hear the remark that a certain symphony sounds purple, or that jasmin smells like the Bach air for the G string, we experience the same sort of bewilderment that ensues on feeling for the top step in the dark where there is none. If one preses the button marked sound expecting a sensation of hearing and straightway sees color, the mind receives the same sort of a fillip as would be given it by the unexpected outcome of a clever play upon words of double meaning.

Such confusion of the senses is not necesarily abnormal or pathological; it does not invariably mean disease or drugs. Statistics have it that colored audition, for example, is found in 30% of normal children and in 12% of normal adults. Casual investigation would indicate that these figures should be much higher, for a little reflection will enable almost anyone of an imaginative temperament to evolve a color-scheme of his own for sounds, tastes, perfumes and other matters varying from changes in the weather to states of the soul. Naturally the color-schemes of different individuals do not always agree, but a striking similarity has been found to occur in many of those independently tested.

Consequently there are on record color alphabets for such diverse matters as the vowels and consonants, arithmetical and geometrical figures, the musical scales and the instruments of the orchestra,

days of the week and months of the year, and for the voices of men and the cries of animals. And we hear of such bizarre combinations as "the odor of tincture of valerian recalls to me the color produced by the miawling of a cat"; "a cube appears black and cold while a circle seems red and warm"; "the sound evoked by looking at a square is deeper and more solemn in tone than that produced by the sight of a triangle." There is a musician to whom the third act from Tannhaüser always appears as a curved line; and another who always sees an acute angle with the apex pointed at him while listening to the Sonata Appassionata of Beethoven.

A serious application of color hearing was attempted as long ago as 1759 in one of the earliest recorded efforts to penetrate the isolation of deaf-mutes. Père Castel, after a study of the consonances of colors and music, came to believe that an idea of musical composition, both melody and harmony, could be conveyed to the deaf by the means of colors flashed through the shutters of variously tinted lamps. Quite as practical was the expedient of a painter who took advantage of similar consonances between color and sound. He was wont, when at a loss for ideas in his color scheme, to leave his painting and resort to the violin, improvising until he drew from the reluctant strings the sound of the shades and tones that he had sought in vain for his picture.

The several arts have not only paralleled but interpenetrated each other in the course of their development to such an extent that it is not entirely unintelligible when we speak of the color of music or say that a certain painting conveys an impression of music. No stretch of the imagination is needed to appreciate what is meant when a costume is described as "a symphony in gray or green." A step further in the same direction is all that is necessary to understand those who maintain that a major chord is always red and a minor chord always violet; that Haydée's air from the "Enfants de la Noble Venise" seems of a chocolate color throughout; and that the air in A major from the scherzo in Schubert's symphony in C major gives an impression of streaming sunlight and of a verdant green so fresh and clear that it conveys the odor of young pine trees.

In persons who are possessed of the faculty of color hearing, the hearing of any sound but particularly those of the vowels, causes a simultaneous sensation of color. This color is generally thought of or seen within the mental horizon, more rarely projected externally and visualized as though actually passing before the eyes. This is entirely different from the common association of colors with objects because of some fancied or emotional analogy as, for instance, blue Monday and black Friday. The relation here is obvious; the name of the day is not seen as a color, but blue in a figurative sense is attached to the day that inaugurates the drudgery of a new week. The true color auditist never hears or sees the word Wednesday without experiencing a sensation of the color yellow, never hears or reads the word Sunday without seeing green.

In 1891 at the Théâtre des Arts in Paris a work entitled the "Canticle of Canticles" was presented in a manner which attempted to arouse simultaneously in the minds of the spectators the greatest possible number of related sensory images. Music, speech, color and perfume were so combined as to convey the effect of a single color in a massed attack on the senses of the audience. Take the color orange, for example. The majority of color-hearers perceive the vowel "i" as orange in color. Therefore the lines of one of the leading characters contained the greatest possible number of words in which this vowel occurs. During the time that this particular personage occupied the spot-light, the color sound of his lines was augmented by a symphony in "re" which sounded softly from the wings, "re" being the note of the musical scale most often perceived as orange in color. Appeal to the eye naturally was made through a costume in the make up of which orange predominated, and in order to increase the number of sense avenues by which the chosen color could be made to assail the receptive centers of the assembled color hearers, the perfume of white violets was sprayed at the same time through the prompter's opening from the stage toward the audience. For the perfume of white violets, when inhaled, is known to arouse the sight of orange in the majority of color hearers. Similarly, four other leading characters appeared in costumes of black and white, red, gray and green and recited lines surfeited with the vowels "a", "e", "o" and "u" respectively, while during the period that each was the center of attention a perfume redolent of his particular color was wafted toward the house and a symphony in "do", "mi", "la" or "si" emanated from back stage.

Smelling colors and temperatures, hearing perfumes and tastes, recognizing human voices by their colors, ascribing colors to tastes, smells and temperatures, and similar bizarre sensory combinations, imply technically the subjective perception of a sensation of a different sort from the one that is being objectively stimulated. The sensory nerves are highly specialized wires, each capable in our ordinary experience of carrying only one form of message. Only savour travels over the nerves of taste, only odor travels over those of smell, only sounds pass along the nerves of hearing, only sights arrive in the brain by way of the optic nerve, and the nerves of touch serve only for feelings of contact. For this reason it is the element of surprise and unexpectedness that is accountable for the odd effect produced when stimulation of one of these senses results in a sensory image being registered in the brain of a nature that we are accustomed to receive only by another route.

This is quite a different mechanism from that involved when several senses are simultaneously called into play by one and the same stimulus being applied separately and directly to the various sensory organs. The "taste" of wine and the "flavor" of tobacco are good examples of the latter. To appreciate the four cardinal points of a grand vin, technically known as "color", "fruit", "bouquet" and "body", the connoisseur must have an eye appreciative of color, a nose sensitive to the finest nuances of perfume, and a tongue and palate capable of distinguishing the most subtle savours. Four senses are acted upon separately and directly by the same stimulus. The eye sees the color, and the wine, in passing over the tongue and palate, acts upon the nerves of taste to produce savour as well as on the nerves of touch to give variations of sharpness or velvetiness, the while its volatilized ethers mount to the nose to assail the delicate endings of the nerves of smell. In similar fashion the smoke of a cigar acts simultaneously upon nerves labeled taste, touch and smell, not neglecting those of sight for obtaining the fullness of its effect. For any tobacco addict will admit that he derives little or no satisfaction from smoking in the dark, and it is often impossible to say without the use of the eyes whether a cigar is alight or not, whether smoke is being inhaled or air. In both these

examples, stimulation of the appropriate organ results in the sensation normally associated with that organ; smell for the nose, sight for the eyes, taste for the tongue and touch for the tactile nerves, with an end-result of complete harmony. But when sight results from stimulation of the ears, sound from stimulation of the eyes, and so on, the perceptions aroused are as truly dissonant as those musical dissonances to which one must become accustomed with the same difficulty that a taste for olives is acquired.

It is not necessary to be a color thinker to appreciate the relations that have been established between architecture on the one hand and music, color and perfume on the other. Vincent D'Indy in his "Course on Musical Composition" has quite happily compared the evolution of primitive architectural forms with that of the early musical forms of the same epochs. Most of us are aware of an affinity blending into one harmonious whole the diverse elements of beauty evoked by a pure Gregorian song, or a theme in true liturgical style from a master of the 16th century, when heard in the setting of some Roman or Gothic cathedral, to the accompaniment of mystical light filtering from the variegated panes through the enveloping perfume of a cloud of burning incense. The sensations thus aroused are, again, quite different in mechanism from those known as color-thinking, perfume-hearing and music-seeing. They depend on simple elementary feelings of a soul-stirring sort that we and our ancestors have learned to associate because of their similar emotional character.

For the true color thinker the sound of each musical instrument has its characteristic color. The tone of the violin has been found to be light blue; of the flute, red; of the French horn, purple; of the clarinet, yellow; of the violincello, indigo blue; of the trumpet, bright red; of the oboe, rose; and of the flageolet, violet. Different melodies may have colors of their own, which, of course, will be modified according to the color sound of the instrument on which they are played. That human instrument of sound, the voice, has likewise its color scale and color effects. It is said to be heard often as blue, not infrequently as red or yellow, more rarely as green. The yellow voice has the most agreeable and pleasing effect. Naturally, the color of the same note will vary with the register of the voice. The "c" of the base may be heard as "lilac"; of the baritone, as reddish lilac; of the alto, as rose; and of the soprano, as yellowish rose.

In recent years a musical novelty in the form of a much advertised color-organ has been presented in New York theatres for the delectation of a jazz-movie satiated public. By this device, the organist, playing upon a bank of keys and with the aid of calcium lights, is able to throw ever changing chords of color upon the screen, these color symphonies being synchronized with appropriate music from the orchestra. The popularity of the color-organ has not been great, but it serves at least to remind us of the more delectable mouth-organ of Jean des Esseintes. At the risk of exciting both friends and foes of the great prohibition shibboleth, we cannot refrain from adding to our story the history of this worthy, whose claim to fame is based upon the theory of reciprocity between chords and cordials. Huysmanns, his creator, believed that every liqueur has its equivalent in the timbre of some musical instrument; consequently it should be just as possible to hear a symphony of musical chords played on the palate with cordials as to taste a symphnoy of cordials poured from the instruments of an orchestra. He expounded this belief in his novel, "A Rebours" in the person of Jean des Esseintes who was so blessed with a "taste" for music that he possesed the happy faculty of hearing in his throat the sounds of cordials as they trickled over his tongue and palate.

For him curacoa had its equivalent in the tartish note of the clarionet; kummel, in the nasal twang of the oboe; kirsch, in the furious fanfare of the trumpet, while gin and whiskey overwhelm the palate with screaking bursts of the slide-trombone. He talks of the vault of the palate resounding to a string quartette composed of a first violin with its sound of old cognac, smoky and subtle; a second violin like full-bodied rum, sonorous and rumbling; the heart-rending violincello with a tone as disconsolately caressing as a draught of vespétro; and the viola, black and solid like old bitters. Thanks to this association of sound with taste, Jean was accustomed to extemporize silent harmonies and unsung melodies. His palate vibrated with solos of crême-de-menthe and duets of curacoa and bénédictine, while pousse-cafés with the pearly notes of the nightingale trilled pastoral symphonies in his throat.

We wonder what sort of music Jean des Esseintes would make of the sodas and sundaes of America A. D. 1927! And if jazz is the answer, we wonder again if he would find the cold comfort of either seltzer or syncopation worth while.

67 Hanson Place.

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During 1926 the Rockefeller Foundation, in disbursing $9,741,474, (1) aided the growth of fourteen medical schools in ten different countries; (2) maintained a modern medical school and teaching hospital in Peking; (3) assisted the development of professional public health training in fifteen institutions in twelve countries and in ten field stations in the United States and Europe; (4) contributed to nurse training schools in the United States, Brazil, France, Poland, Yugoslavia, China, Japan and Siam; (5) sent, as emergency aid, journals, books, or laboratory supplies to institutions in twenty European countries; (6) helped twenty-one governments to combat hookworm disease; (7) gave funds to organized rural health services in 244 counties in the United States and to thirty-four districts in twelve other countries; (8) shared in the creation or support of various departments in state or national health services in sixteen countries; (9) cooperated with Brazil in the control of yellow fever, or in precautionary measures against the yellow fever mosquito, in ten states; (10) continued yellow fever surveys and studies in Nigeria and on the Gold Coast; (11) aided efforts to show the possibilities of controlling malaria in nine North American states and in Porto Rico, Nicaragua, Salvador, Argentina, Brazil, Italy, Spain, Poland, Palestine, and the Philippine Islands; (12) helped to improve the teaching of physics, chemistry, and biology in eleven institutions in China and in the government university of Siam; (13) supported the Institute of Biological Research of the Johns Hopkins University and contributed toward the publication of Biological Abstracts; (14) gave funds for biological or mental research at Yale University, the State University of Iowa, and the Marine Biological Station at Pacific Grove, California; (15) provided, directly or indirectly, fellowships for 889 men and women from forty-eight different countries, and paid the traveling expenses of sixty-nine officials or professors making study visits either individually or in commissions; (16) helped the Health Committee of the League of Nations to conduct international study tours or interchanges for 120 health officers from forty-eight countries; (17) continued to aid the League's information service on communicable diseases; (18) made surveys of health conditions, medical education, nursing, biology, or anthropology in thirty-one countries; (19) lent staff members as consultants and made minor gifts to many governments and institutions; (20) assisted mental hygienic projects both in the United States and in Canada, demonstrations in dispensary development in New York City, and other undertakings in public health, medical education, and allied fields.

Dislocation of the Shoulder Associated With Fracture of the Scapula*

JACOB GROSSMAN, M.D.

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New York

Dislocations are not often seen by the roentgenologist before being reduced. The majority are reduced and then sent for x-ray examination to see if the reduction had been made or to rule out a possible fracture. One of the cases to be reported was reduced and then sent for *x*-ray examination to see if the reduction had been complete. Signs and symptoms of fracture were clouded by the presence of the dislocation. The x-ray report came back that the dislocation had been overcome, but the presence of a linear fracture of the glenoid, which we did not suspect, was reported.

Case 1. Fig. 1.

The second patient reported to us several weeks after she had injured her shoulder. Clinically she presented all the signs and symptoms of a subglenoid dislocation of the shoulder. Signs and symptoms of a fracture were not elicited, so that the presence of a fracture was not suspected. However when the x-ray report was returned, it showed that not only was there a subglenoid dislocation of the shoulder, but there was also present a fracture of the acromion process of the scapula.

Both of these patients were in the third age period. Dislocations in the third age period are generally the result of falls and occur with the same relative frequency in both sexes. In this age period, however, we find that these dislocations are often associated with fractures of the greater tuberosity or of the surgical neck. It is common to see a fracture of the surgical neck with the end of the shaft in the glenoid fossa and the head dislocated outward.

Both of these cases were in women almost the same ages, one was sixty-four years of age and the other was sixty-five. The both of them had fallen, one striking her shoulder against the pavement, while the other struck her shoulder against a packing box. The symptoms in one were so severe that she was compelled to seek relief immediately, while the other suffered so little that she did not seek medical relief until several weeks had elapsed.

CASE REPORTS:

Case 1.—Jennie K., sixty-four years of age, housewife by occupation. One half an hour prior to her visit, the patient tripped over a board and fell, striking the summit of her left shoulder against the pavement. Immediately after the fall, the patient experienced severe pain in the left shoulder and with it complete loss of function. The pain was aggravated when the arm was held dependent and somewhat relieved when the patient's uninjured hand supported the affected side.

Case 1. Fig. 2.

Examination:

The patient supported the injured extremity with the normal hand. There was swelling and fulness in front of the left shoulder joint, hollowness and flatness over the region of the shoulder cap at the deltoid area. The axillary fold level was altered.

Slight ecchymosis was present. The vertical axis of the arm was changed.

The shoulder was found to be flattened, the head of the humerus was out of the axilla and was in front of the joint close to the coracoid process. Pain on pressure and manipulation was present. The elbow and inner arm could not be brought to the side of the chest, and the hand could not be placed on the opposite shoulder with the arm touching the side.

Case 2. Fig. 3.

Function was abolished due to the pain and the false position.

* Cases presented at meetings of the Bronx Surgical Society.

A diagnosis of subcoracoid dislocation was made and reduction by the Kocher method, without anesthesia was accomplished.

A modified Sayre dressing was then applied.

The patient was then sent to a roentgenologist for an x-ray examination and the following report was returned.

The head of the humerus is in proper relation to the glenoid fossa. There is a linear fracture through the head of the scapula involving the glenoid fossa. There is very slight separation of the fragments. (Figure one).

The patient did not have a stormy convalescence and made a complete recovery within twenty-five days. (Figure two).

Case 2.—Bessie J., sixty-five years of age, housewife by occupation. Several weeks prior to her visit, the patient fell striking her right shoulder against a packing box. Her symptoms and disability were so slight that she assumed that she had only sprained her shoulder and therefore did not seek medical relief. After applying home remedies for several weeks, without apparent success, she decided to seek medical relief.

Upon examination it was found that there was swelling and fulness in front of the right shoulder joint, hollowness and flatness over the region of the shoulder cap at the deltoid area. The axillary fold level was altered. The vertical axis of the arm was changed.

The shoulder was found to be flattened, the head of the humerus was out of the axilla and was in front of the joint close to the coracoid process. Pain on pressure and manipulation was present. The elbow and inner arm could not be brought to the side without pain and the hand could not be placed on the opposite shoulder with the arm touching the side.

Function was abolished due to the pain and the false position.

A diagnosis of subcoracoid dislocation was made. (Figure three).

The patient was sent to a roentgenologist for an x-ray examination and the following report was returned.

Subcoracoid dislocation of the head of the right humerus. Fracture of the outer end of the acromion process of the scapula, with very little displacement of the outer fragment. (Figure four).

The dislocation was then reduced by the Kocher method without anesthesia and the shoulder immobilized by a modified Sayre dressing.

The patient was then sent to the roentgenologist for another examination and the following report was returned.

The head of the humerus is in proper relation to the glenoid fossa. Fracture of the outer end of the acromion process of the scapula, fragments in good position and alignment. (Figure five).

The patient made an uneventful recovery within thirty-five days. (Figures six and seven).

Conclusions:

1. Dislocation of the shoulder may be accompanied by a fracture of the scapula, more often than was formerly suspected. The symptoms and signs of the dislocation undoubtedly overshadow those of the fracture. Many of the dislocations are reduced and if no x-ray examination is made afterward, the presence of the fracture is often overlooked.

2. Fortunately, the presence of these fractures did not prolong or interfere with convalescence.

3. The impression prevails that the usual type of fractures associated with dislocation of the shoulder are fractures of the greater tuberosity or of the surgical neck of the humerus. The two cases herein reported demonstrate that that is not always the case. One should remember that fracture of the scapula may also be associated with dislocation of the shoulder.

4. After reduction, immobilization of the shoulder by means of a modified Sayre dressing, followed by early heat therapy, massage, passive and active movements was the treatment employed in the cases.

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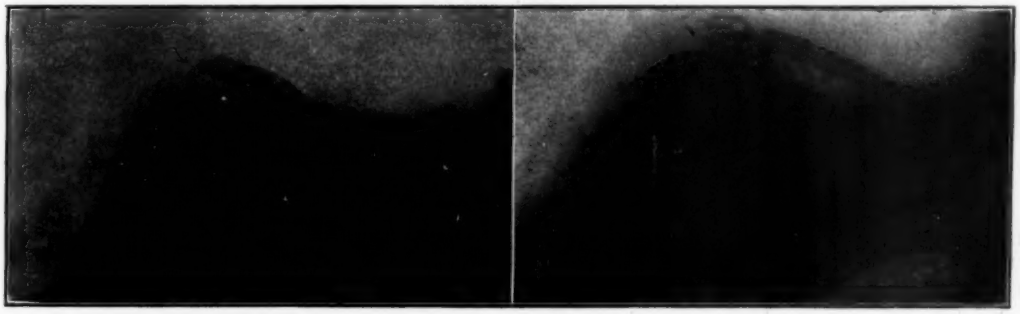

Case 2. Fig. 7.

Case 2. Fig. 8.

Case 2. Fig. 6.

Case 2. Fig. 7.

Interesting Ratios

The United States still has more physicians in proportion to its population than any other country. In 1925 there was one physician to every 753 people, while Great Britain reports (1921) one physician to every 1,087; Switzerland and Japan reported (1925) one, respectively, to every 1,290 and 1,359; Germany 1912) one to every 1,940; Austria (1912) one to every 2,120; Sweden (1925) one to every 3,500.

Appendicitis Complicating Pregnancy

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Appendicitis is frequent and doubly significant during the child-bearing period. It, not uncommonly, complicates and unfavorably influences pregnancy; at times, it provokes the premature termination of gestation. Appendicitis occurring during gestation can prove fatal to the mother, to the fetus, or to, both, mother and fetus. It is well deserving of study by the gynecologist, the obstetrician and the surgeon. All the various grades and varieties of appendicitis, primary or secondary, acute, subacute, chronic or recurrent, catarrhal, ulcerative, suppurative, gangrenous, perforative or adherent, and its various complications and sequelae, adhesion formation, abscess formation or peritonitis, localized or generalized, occur during gestation. The morbidity and mortality of appendicitis is greater in the pregnant than in the non-pregnant. Early and correct diagnosis, followed by immediate appropriate and skillful surgical relief, will reduce, both, the morbidity and the mortality of the disease under consideration.

This contribution is an analytical study of all the operated cases of appendicitis associated with gestation, intra- and extra-uterine, reported in the English, French and German medical literature from 1916 to 1926 inclusive.* In the *Illinois Medical Journal*, April, 1917, xxxi, 215, I published a similar study of 173 operated cases of appendicitis associated with pregnancy, reported from 1900 to 1915 inclusive.

This analysis of 405 cases of appendicitis diagnosed either at the operating table or established by the post-mortem findings, amplifies and supplements my previous publication. They occurred in 405 pregnancies, 21 of which were ectopic in location, while the remaining 384 cases were intra-uterine.

Appendicitis complicating the puerperium is not considered in this paper; it imperils only the maternal life and constitutes a separate chapter of appendicitis. Uterine gestation complicated by appendicitis presents two indications: The saving of the fetal life and the saving of the maternal life. Of the two, the latter is paramount.

Cases in which the diagnosis of pregnancy was not fully established at the time of operation were also excluded. Tracy (5) removed an acutely inflamed appendix from a stout nulliparous woman. She had missed her menstrual period for a few days. It was not possible, previous to or at the time of operation, to make a positive diagnosis of gestation. Time settled the question; she was delivered at full term.

Cases in which the products of conception were expelled from the uterus previous to the development, diagnosis or surgical intervention for the relief of appendicitis were omitted. In a twenty-one year old primipara (35), labor pains appeared during the ninth month of gestation; the cervix dilated and spontaneous delivery of a non-viable child occurred. The abdominal pain continuing and the general symptoms becoming worse, appendectomy was performed on the following day. Inflammatory products escaped from the abdominal cavity and death of the mother six hours after from general peritonitis. Needless to say that we also excluded cases in which the removed appendices were found, after careful examination, to be normal (37).

* All the medical publications that are to be found at the John Crerar Library, Chicago, Ill.

Pus collections, presumably of appendiceal origin, evacuated by colpotomy were excluded, unless the diseased appendix was exposed to inspection or direct palpation. This explains the omission of cases similar to that reported by Favreau and Chaput (19) in which 500 grammes of dark brownish pus were evacuated by colpotomy. The appendix not having been exposed, the clinical diagnosis of appendicitis was only presumptive and not conclusive.

Extra-Uterine Pregnancy

Extra-uterine gestation, aborted, ruptured or in progress, abdominal or intra-ligamentary, ovarian, tubal or tubo-ovarian, calls for immedite removal of the ectopic fetal sac, irrespective of the age of the pregnancy or of the mother's general condition. This is a life-saving indication. In ectopic pregnancy, the life of the fetus is to be disregarded. Appendicitis, irrespective of type, calls for surgical treatment, ablation of the appendix preferably.

Ectopic pregnancy occurs at all periods of the child-bearing age. Ectopic pregnancy and appendicitis are surgical conditions, each calling for immediate operative relief. When the two conditions coexist, the call for surgery is two-fold. The fetal sac and the diseased appendix should be removed at the same sitting. This double removal is the procedure of election; it was instituted in twenty of the cases herein considered and was followed invariably by recovery. Some clinicians follow a different course. Gore's (21) patient presented the symptoms of appendicitis; the point of greatest tenderness was four inches to the right of the umbilicus and about one inch above. Bimanual examination showed a soft cervix, admitting the tip of one finger. Child's head was felt through the lower uterine segment. Patient complained of excessive fetal movements. During examination, vigorous movements were observed through the abdominal wall. The appendix was removed. On the 7th postoperative day, it was decided, after consultation, to deliver the patient. The patient having been etherized, manual dilatation was begun, and the uterus was found empty. A laparotomy was then performed; the peritoneal cavity contained blood-stained fluid and a large, bluish tumor the size of a six-months' pregnant uterus, attached to the right broad ligament by a small twisted pedicle. This sactumor had made two complete turns on the axis of its pedicle and had the odor of degenerating blood. The pedicle was clamped, the stump transfixed and ligated, and the tumor removed. Examination of pelvic organs showed uterus in normal position, enlarged to three times its normal size. Left tube and ovary normal. Drainage; abdomen closed in usual manner. Tumor which included the right tube and ovary contained a six-month male fetus, apparently dead for thirty-six or forty hours. In four cases (23, 25, 39), the inflamed appendix and the ruptured fetal (tubal) sac were removed at the same sitting. In these four cases as in all tubal pregnancies that rupture into the peritoneal cavity, peritoneal flooding was present. In three cases (29, 39) of incomplete tubal abortion, the tube, the products of conception and the inflamed appendix were all removed at the same sitting. The appendicitis that coexists with ectopic gestation is usually chronic. All but two patients gave a history of having

had previous attacks of appendicitis. In most cases, the appendix was found to be adherent to some adjacent organ or structure: Omentum, right tube and ovary, uterus, or urinary bladder.

Age

Appendicitis occurs at all periods of the child-bearing age; its incidence is possible in any gestation, first, subsequent or last, uterine or extra-uterine, single, twin or multiple. In the cases herein analyzed, the age incidence is reported as follows:

From 15 to 20 years	46 cases
" 21 to 25 "	107 "
" 26 to 30 "	100 "
" 31 to 35 "	63 "
" 36 to 40 "	25 "
" 41 to 45 "	3 "
" 46 "	1 case
Age not stated	60 cases

In the above cases, the age stated is that of the patient at the time of operation. The three youngest patients were 15 years (one 32) and 16 years (two cases) of age, respectively. One of the last two patients was operated after the acute symptoms had subsided (25); the other, during the acute attack (39). The oldest patient was 46 years of age (39).

No relation was observed to exist during gestation between the age of the prospective mother and the extent, virulence and outcome of the appendiceal inflammation. More than one-half of the cases occurred between the ages of twenty-one and thirty, inclusive.

Number of Previous Pregnancies

Primipara	36 cases
II-parae	143 "
III-parae	74 "
IV-parae	6 "
V-parae	4 "
VI-parae	2 "
VIII-parae	2 "
IX-parae	1 case
Multiparae	2 cases
Not stated	135 "

One patient (8) presenting a five-month-pregnant myomatous uterus, had never had any living children, but had two miscarriages. Another patient was a three-month-pregnant multipara (9). In 135 cases, the reporters do not state whether their patients had previously been pregnant. In 143 cases, over one-half of the cases in which the number of pregnancies is reported, the inflamed appendix was removed in the second gestation. Seventy-four cases occurred in III-parae.

Period of Gestation

The more advanced the gestation, the greater the probability of its interruption in the presence of appendicitis. It is hard to establish the exact age of the gestation; it is equally difficult to determine the age of the fetus at the time the symptoms of appendicitis first become manifest. Appendicitis occurs at all periods of gestation. In our collected cases, the maximal frequency was observed during the second (64 cases), third (83 cases) and fourth month (75 cases). It is rare in the last few weeks of pregnancy. The subjoined table shows the age of the pregnancy at the time of operative relief of the appendicitis.

1st month	8 cases
2nd "	64 "
3rd "	83 "
4th "	75 "
5th "	44 "
6th "	42 "
7th "	23 "
8th "	25 "
9th "	11 "
10th "	5 "
Not stated	25 "

In case 12, an appendectomy was performed during the active stage of labor. The first day of last menstruation and the descent of the uterus in the thirty-eighth week indicated that the expectant date would lie between July 15th and 20th. The symptoms of appendiceal disturbance began on the 15th. On the same day, the patient began to complain of definite, infrequent and irregular girdle pains, beginning in the "small of the back" and migrating forward and downward to the hypogastrium. Examination revealed a beginning dilatation of the cervix. On the 17th, the appendix in the preperforative stage of gangrene and containing two drams of pus was removed. Nine hours after operation, labor was complete.

Pathology

The appendix, in the gravid or non-gravid state, often presents variations in size, length, mobility, location and contour which are not without influence on the course of appendicitis. Not uncommonly, old or new, inflammatory adhesions bind the appendix to contiguous organs; these adhesions may be so firm and so extensive as to make the operative procedure tedious and difficult. Chronic appendicitis is often productive of adhesions that interfere with the enlargement of the uterus, with its emergence from the pelvis, with the uterine contractions at time of labor. These adhesions play an important rôle in the etiology of oophoritis, abortion, subinvolution and extra-uterine pregnancy.

Associated conditions not infrequently occur. They antedate or complicate the appendicitis and aggravate the prognosis. Salpingitis, unilateral or bilateral, was noted by Jerlov (32) in at least 15 per cent of the cases; ovarian tumors: dermoid (37), papillary and other crysts (39) are not uncommon. Case 3 presented, in addition to the appendicitis and the gestation, an ovarian dermoid cyst four inches in diameter, containing sebaceous material, six teeth and some hair; case 7 presented a man's head-sized ovarian tumor. All varieties of ovarian tumor, dermoid cyst in particular, may complicate pregnancy. They call for immediate operative removal, because they increase the probability of abortion and may hinder delivery. Ovarian tumors and cystomata may be the seat of torsion, gangrene from pressure, rupture and suppuration and can determine accidents fatal to the mother and to the foetus (7).

Inflammation has manifold manifestations and various terminations. It terminates either in resolution, fibroid thickening, ulceration, suppuration or gangrene. An inflammation involving the whole thickness of the wall of a hollow viscus, such as the appendix, may result in perforation. Because inflamed appendices present various grades of inflammation, classifications based upon the preponderating lesion lack precision. When gangrene was the preponderating lesion, the appendicitis was classified as gangrenous; if a perforation existed, the appendicitis was classified as perforative.

Many serviceable classifications of appendicitis have been proposed. We have adopted the following, though conscious of its shortcomings:

Acute catarrhal, with or without ulceration	108 cases
Acute suppurative without abscess formation	3 "
Acute suppurative with abscess formation	7 "
Acute suppurative with circumscribed suppurative peritonitis	70 "
Acute suppurative with diffuse suppurative peritonitis	28 "
Acute gangrenous	52 "
Acute gangrenous with abscess formation	1 case
Acute gangrenous with diffuse peritonitis	1 "
Acute perforative	5 cases
Acute perforative with gangrene	3 "
Acute appendicitis and acute gonorrheal salpingitis with peritonitis (5)	1 case

Chronic with adhesion formation	14 cases
Chronic without adhesion formation	11 "
Chronic: No mention made of the presence of adhesions	66 "
Too briefly reported	35 "

In the suppurative form, the pus was present either in the lumen of the appendix (12), in its wall or in the form of a peri- (23) or para-appendiceal (3) abscess. Several retro-cecal abscesses are reported (16). "Large appendiceal abscess extending above to the navel and beyond the mid-line" (10). The appendix may be adherent to the posterior abdominal wall (3), to the ascending colon (3), to the right adnexa and uterus (7), to the right tube (39), to a foetal cyst (25), to the omentum, intestine and tube (23), may be buried in inflammatory tissue (6), etc.

In operating on cases of appendicitis, one notices the presence of a peritoneal exudate, localized or diffuse, varying in quantity and in nature in different cases: Serous (29), serous with numerous flocculi (6), purulent (22), etc.

Diagnosis

Appendicitis occurring during gestation often offers diagnostic difficulties not present in the non-gravid state. Mild attacks are often misdiagnosed; they are mistaken for the digestive disturbances incident to the onset of pregnancy or for some of the other discomforts of gestation, such as can be caused by congestion of the ovaries, stretching of the uterine ligaments, etc.

According the acuteness and duration of the symptoms presented by each individual case, 279 cases were acute and 91 chronic; in 35 cases, the reports are incomplete and do not permit exact classification.

The symptoms of appendicitis in the gravid state are those of the disease in the non-gravid state, with variations determined by the age of the pregnancy, the foetal movements, the changed abdominal conditions, etc. Coincident pathological conditions modify and blurr the clinical picture. Pyelitis (unilateral-37 or bilateral-36), is reported as having coexisted in a few cases.

During pregnancy, especially from the fourth to the seventh month, pain in the right iliac region is common. Not infrequently it is due to traction exerted on peritoneal bands and adhesions by the enlarging uterus. The ascending uterus can displace the colon, coecum and appendix upward (32—six cases), forward and outward. The upward, forward or backward and outward displacement of the coecum and appendix occurs only in a fraction of the cases; it interferes with proper drainage of the appendiceal region and, in the later months of pregnancy, is of diagnostic and operative concern. Adhesions due to a previous inflammation bind down the appendix, limit its mobility and prevent its displacement. Abdominal pain must not be misinterpreted; its importance must not be misjudged. Pain and digestive disturbances call for proper recognition and interpretation. A patient should neither be subjected to the dangers of a needless operation nor deprived of the benefits of an indicated one. In appendicitis, the site of maximal pain and tenderness always corresponds to the location of the appendix (10, 12, 15, 19, 21, 24, etc.). If the latter be a pelvic organ, the site of the pain is pelvic; if an abdominal organ, the pain is abdominal.

In the non-gravid female, the appendix has been found in all parts of the pelvic and abdominal cavities; in pregnant women, variations of location are less uncommon. The appendix has been found in the right lumbar region (16), in the left side of pelvis (5), immediately beneath the liver (27).

The initial pain is felt in the upper abdomen or epigastrium (15); in most cases, it becomes gradually localized to the location of the diseased appendix (20), usually, the right iliac quadrant. In the acute forms, the pain is sharp and lancinating in character and frequently radiates down the right thigh. In the subacute and chronic forms, it is more of a constant dull ache. It may intermit.

The most reliable symptoms are: Localized pain, localized tenderness, and localized muscular rigidity over the region of the appendix, usually, the right lower abdominal quadrant. The symptoms: Fever, rapid pulse, chills (9), leucocytosis, nausea and vomiting are of less diagnostic value, because they are frequently absent in early cases, occur in many other disturbances incident to the period of gestation, and are characteristic only after the infection has begun to spread. If perforation occurs or pus collects, palpation usually detects a tumor mass. In appendicitis, abdominal pressure so made over the descending colon as to force gas toward the head of the coecum, increases the pain (Rovsing). It is most important to elicit a careful history and to obtain an accurate report of previous attacks. Patients who, prior to gestation, have had appendicitis treated non-operatively suffer, more or less, disturbance in the appendiceal region during pregnancy. One hundred and sixty-three cases gave a history of one or more previous attacks (3, 4, 6, etc.). The value of leucocytosis as a diagnostic aid is lessened by the fact that, in pregnancy, a leucocyte count up to 12,000 is not pathologic. Nevertheless, a high leucocytosis with a high polymorphonuclear count, if associated with other symptoms of appendicitis, is very suggestive of the existence of the disease. We find reported a leucocytosis of 16,000 with 87 per cent polynuclear (32), of 18,000 (18), or 22,000 (24), of 23,500 (22).

In the latter months of pregnancy, an early and correct diagnosis may prove, at times, very difficult, especially when the appendix is displaced immediately beneath the liver. Diseases of the gall-bladder, of the right kidney, of the stomach, of the liver, of the uterine adnexa simulate appendicitis and confuse the clinician. All these affections must be considered and excluded. In many cases the clinician must be satisfied with a probable diagnosis. Valuable time may be lost in attempting to make an exact differential diagnosis. Careful and repeated examinations of the catheterized urine from each kidney show the presence or absence of unilateral or bilateral pyelitis. In the presence of pyelitis, one notes pyuria, bacteriuria and sensitiveness to pressure of the affected kidney or kidneys.

If appendicitis be mistakenly diagnosed ectopic pregnancy or vice versa, the mistake is negligible as both conditions call for immediate surgical relief, the first step of which, in both cases, is abdominal section and inspection and palpation of the existing pathology. Exploratory laparotomy finds here an urgent indication.

When adnexal and appendiceal disease coexist, accurate diagnosis is more difficult. They may be of separate and independent origin or secondary one to the other; the pathological process extending by continuity or contiguity of tissue, or by lymphatic or vascular routes. Vagino-abdominal examination aids in differentiating a diseased appendix from adnexa the seat of inflammatory, cystic or neoplastic changes.

Prognosis

There is no fixed relation between the severity of the symptoms presented by the patient and the existing anatomical lesions; therefore, it is difficult to make an exact pre-operative prognosis as to fetal and as to maternal life.

Appendicitis is a dangerous disease. Many cases, apparently mild at the onset, prove fatal. The safety

of the mother, be the case acute or chronic, is best assured by an early and immediate removal of the appendix and by non-interruption of gestation. It is universally admitted that early recognition and immediate operation holds forth a far better prognosis for the mother and for the gestation. Generally speaking, the less advanced the gestation, the less likelihood of appendectomy being followed by interruption of pregnancy. Operate, if possible, before the occurrence of suppuration, gangrene or perforation and thereby forestall the development of serious complications. After the fifth month of pregnancy, the operative difficulties are increased: The uterus occupies the larger part of the abdominal cavity, suppuration is more frequent, adequate drainage is more difficult to secure. "Drainage was necessary; abortion followed two weeks after operation" (2). In the appendicitis of the later periods of gestation, tympanitis, when present, interferes more with respiration and intestinal obstruction is of not uncommon occurrence. There is increased vascularity and marked lymphatic dilatation of the peri- and para-appendiceal region; phlebitis and thrombosis are more prone to develop; the pus shows a tendency to burrow more widely and there is less likelihood of encapsulation. The omentum and small intestines in this later period cannot as easily protect the appendix.

During gestation, the prognosis of appendicitis is influenced by many factors. Other factors being equal, the morbidity of this condition is more varied and its mortality higher in the pregnant than in the non-pregnant. The pregnant female is an individual of lessened resistance to infectious and toxemic processes; this lessened resistance is most noticeable in the later periods of pregnancy and in the presence of a virulent infection.

The pregnant uterus reacts unfavorably on the chronically inflamed appendix; likewise, an acutely inflamed appendix may so disturb the pregnant uterus as to induce abortion and thereby subject the patient to the combined morbidity of uterine abortion and appendiceal inflammation. Appendicitis may initiate abortion previous to, during or after the removal of the appendix. The mother and the fetus may live; the fetus may live and the mother die: the fetus may die and the mother live, or both may die; in some cases, the fetus may be dead previous to operation (32), and in some cases, the mothers have died undelivered (32).

Abortion may result from infection conveyed to the ovum either by the maternal blood or the lymphatic vessels, by the mucosa and submucosa of one or both tubes and the uterus. Abortion, induced or spontaneous, is always an aggravating factor.

The important difference existing between clinical recovery and anatomical recovery must not be ignored. It is that difference that impels us to advocate early operation. The efforts of the uterus to expel its contents may rupture encapsulated abscesses, tear adhesions limiting the spread of the infection and relight slumbering inflammatory processes. To avoid such disastrous accidents and the general peritonitis resulting therefrom, operate all your cases of appendicitis, and operate them early.

There were 32 maternal deaths. They can be attributed to the virulence of the infection, the advanced age of the pregnancy, the late recognition of the disease, the occurrence of abortion and premature labor, and, especially, the tardy and inappropriate surgical relief (8 month pregnancy, operation on 9th day after onset of appendicitis—25; 7 month pregnancy—36). The most common cause of death was diffuse peritonitis (10). Case 26 was in the 8th month of gestation. She was delivered of a living but non-viable six-month infant four weeks after operation and died on the ninety-first postoperative day. One case (36) died on the forty-seventh postoperative day of acute pulmonary edema. In a patient (36) the blood showed, on the fifth postoperative day, streptococci hemolytici. She died on the sixth postoperative day. Some of the thirty-two deaths were due to complicating coexisting conditions: Placenta praevia totalis (child died during delivery) (18) and consequent hemorrhage.

Three hundred and seventy-three patients recovered from the appendicitis and from the operation; they were restored to normal health. In the early months of gestation, a skilfully performed appendectomy is rarely followed by interruption of gestation. Abortion, miscarriage or premature labor are due either to some complication of the appendicitis or to some adventitious cause and may occur irrespective of the operation employed. With the advent of peritonitis or other serious complication, abortion is not improbable. In the latter months, it is difficult to avoid disturbing the uterus, and the operation may contribute to the untimely termination of the pregnancy. Operation does not jeopardize the mother's life; appendicitis does.

In the twenty-one cases of ectopic pregnancy, the products of conception and the appendix were removed at the same operative sitting. In two hundred and five cases, despite the operation, the appendicitis and its complications or sequelæ, a living child was born. In eleven cases, including one (11) in which cæsarean section and appendectomy were performed at the same sitting, no mention is made of the state or viability of the child.

Premature labor, the expulsion of a foetus at or after the age of viability, is recorded in seventy-one cases. It may occur on the day of operation, on the day following (15), several days later or "four weeks after operation" (26). A few were induced by the medical attendant for syphilis, pelvic contraction, albuminuria (9, 32), etc. Most always, the premature labor was spontaneous, being due, in part, either to the operation, the infection, some associated pathological condition (Ovarian cyst—39; nephritis, pyelitis—36, etc.), or to the combination of various factors. In almost all of the premature labors, the baby died. "Baby died from apnoea" (12); "infant lived but twelve hours" (16); "child died after a few respiratory movements" (22). Jerlov (32) records nine living children in fifty-two interrupted gestations following appendectomy.

In ninety-two cases, either abortion or miscarriage followed, earlier or later, the operation. It is most always a clinical manifestation of severe maternal infection and therefore is more frequently observed after late operation and individuals of lowered resistance. In septic abortion cases, the raw uterine cavity and its thrombosed gaping vessels increase the dangers of spreading infection. Some cases aborted shortly after operation: 12 hours (30), second day (5), on the fourth day (10), five days (37), others, as long as two weeks (2), etc. Case 5, eight weeks pregnant, was operated at one sitting for acute appendicitis and acute gonorrheal salpingitis. She did not wish the gestation to continue. She miscarried after being discharged from the hospital. In case 8, fifteen days after operation, a five-month foetus was expelled. There coexisted an appendicitis and a massive fibroid encircling the lower half of the uterus and extending up to the umbilicus.

Treatment

Be the patient pregnant or non-pregnant, the curative treatment of appendicitis is operative in nature. Palliative measures have a wide field of usefulness, but only

as pre- and postoperative adjuvants. We know of no valid contra-indication to operative treatment. Women of child-bearing age who have had one or more attacks of appendicitis non-operatively treated, should, at the earliest possible time, submit to removal of the appendix. A pregnant woman whose metabolism is normal is a good surgical risk.

The importance of early and timely operation cannot be overemphasized. The appendix should be removed before it has ruptured. The earlier the appendectomy, the less advanced the pathology, the greater the probability of the patient's uneventful recovery. It is not possible to foresee the outcome of a non-operatively treated appendicitis, therefore the wisest course is to remove the diseased appendix, if feasible. Delay in operating permits the development of complications that are beyond the control of the surgeon. It has often proven disastrous. In cases of suspected appendicitis, do not wait for a positive diagnosis. When in doubt, you are amply justified in performing an exploratory laparotomy, exposing the appendix and removing it. If a condition amenable to surgical correction is encountered, the exploratory laparotomy is serviceable. The harm resulting from the removal of a healthy appendix is negligible.

Interruption of gestation has no place in the treatment of appendicitis complicating uterine pregnancy. The surgeon should remove the diseased appendix, reduce to a minimum all intra-abdominal manipulations, and see that the gestation be undisturbed. Prolonged traumatizing search for the appendix is to be avoided. Should the delivery of the appendix entail the tearing of protective adhesions and the spreading of the infection, limit the operative procedure to drainage of the appendiceal and other infected regions.

Appendicitis complicating gestation presents to the clinician two paramount indications: The removal of the diseased appendix and the non-interruption of gestation. The attendant should strive to have the pregnancy continue undisturbed. It will not be amiss to tell the patient that, despite the operation, abortion or premature labor may occur, but that it is more probable if the case be treated non-operatively. The probability of cessation of gestation increases with the severity of the infection.

Previous to ascertaining by inspection the nature and extent of the diseased process, one cannot decide what operative procedure is indicated in the case at hand. Operate as rapidly as consistent with the indications and the patient's safety. Reduce all handling of the abdominal organs to a minimum.

If, despite all precautions, postoperative abortion occurs, endeavor to secure the spontaneous emptying of the uterus by tamponade, quinine, pituitrin, etc. Avoid all needless manipulation and instrumentation of the uterus.

Appendectomy is almost always an emergency operation; its technique is simple and easy of execution. Any physician of ordinary experience and skill should be conversant with its performance. When feasible, the center of the incision should correspond to the point of maximal pain and tenderness. We frequently employ the gridiron incision, well to the side. The muscles are split, not cut; thus the abdominal wall is not weakened and is able to withstand the distention incident to pregnancy and the muscular strain accompanying labor.

Septic complications tax the diagnostic and therapeutic skill of the doctor. They prolong convalescence, and often put the already weakened resistance of the patient to a severe test. In complicated cases, the incision must, of necessity, be longer, the trauma is greater, and the postoperative shock more marked than in cases of moderate severity.

Appendicitis occurring within several days of the expected time of labor, influences the obstetrician's choice of method of delivery. It may be necessary to resort to vaginal or abdominal Cæsarean section. The coexistence of complicating conditions—an exhausted mother, a contracted pelvis, placenta praevia—may require unusual measures.

The removal of the uterus is a needless mutilation and is never indicated in well-managed cases. Hysterectomy, complete or incomplete, is a difficult operation and should not be undertaken by one of limited surgical experience.

The authors refer to drainage in 188 cases: It was used in 119 and omitted in 69 cases. Some operators used cigarette drains (11), a few, rubber tubing (12), others, a glass-tube (18), and many, wicks of gauze. Drainage, when indicated, is serviceable. It has disadvantages; it has dangers. Its indiscriminate use is to be condemned. The enlarged uterus makes the maintenance of adequate drainage difficult. It must be discontinued as soon as the discharge becomes scanty and serous. The gauze, glass- or rubber-tubing, cigarette drain, or other agents of drainage should not impinge, should not irritate the uterus. Its use is always indicated in para- and peri-appendicular abscesses, in suppurative peritonitis, localized or diffuse, and whenever the peritoneal exudate is copious. The use of drainage, at times, leads to adhesion formation; intestinal obstruction (14) may result therefrom. Other objections are that it is occasionally followed by a fecal fistula (15), by a postoperative hernia (2, 4), etc. If in doubt as to the need of drainage, do not drain.

In 243 cases, the time of operation, with reference to the onset of illness, is not stated. In the remaining 162 cases, it can be tabulated as follows:

Time of operation after onset of illness.	Number of cases.	Number of maternal deaths.	Abortions or premature labor.
Within 24 hours.....	36	1	7
Within 48 hours.....	35	1	16
Within 72 hours.....	77	26	43
From the 4th day to the 6th day incl.	8	1	1
On 9th day of disease...	2	2	2
On 10the day of disease..	2	0	0
One month after.....	2	0	0
Total.....	162	31	69

The above table demonstrates the importance of early and timely operation from, both, the maternal and the fetal standpoint. Early operation curtails the morbidity and is rarely followed by death of the mother. Involvement of the internal genitalia in the appendiceal inflammation predispose to abortion.

The operative procedures resorted to admit of the following tabulation:

In the Uterine Pregnancies

	Cases.	Deaths.	Abortions or premature labors
Appendectomy	371	32	159
Appendectomy and removal of an ovarian tumor	3	0	2
Appendectotmy and Caesarean section	1	0	0
Appendectomy and vaginal section...	1	0	0
Appendectomy and removal of one tube, or of one tube and ovary....	5	0	1
Appendectomy and sub-total hysterectomy	1	0	1
Total.....	384	32	163

IN THE EXTRA-UTERINE PREGNANCIES

	Cases.	Deaths.
Appendectomy and removal of foetal sac and tube and ovary of corresponding side at same sitting.	20	0
Appendectomy; 7 days later removal of ectopic foetal sac	1	0
Total	21	0

Some of the patients were operated under local anesthesia, some under splanchnic and local anesthesia combined (18), others under spinal anesthesia (23), and almost all were subjected to general anesthesia, such as gas oxygen (11), ethylene (24), chloroform (12) and ether.

Most of the cases, with few exceptions, made an uneventful recovery. In one case (10), the patient aborted on the fourth postoperative day and had a stormy convalescence. 'During the twelve weeks of her stay at the hospital, she had pyelitis on both sides, first on the right and then on the left. She had phlebitis in the femoral and popliteal veins, first on the left side, then on the right. She was very ill several times during her long sepsis; but a secondary laparotomy with good nursing and with repeated irrigations of the kidney pelves through the ureteral catheter finally saved her. After six months, she has regained her color and her weight and is in perfect health."

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BIBLIOGRAPHY.

1. McGlinn: *N. Y. M. J.*, 1916, Civ., 248.
2. McLean: *Texas State J. M.*, 1916, xii, 296.
3. Doyle: *Am. J. Obst.*, 1916, Lxxiv, 849.
4. Jennings: *J. Florida M. A.*, 1916, iii, 82.
5. Tracy: *Penn. M. J.*, 1916, xix, 826.
6. Tate: *Lancet-Clinic*, 1916, Cxv, 133.
7. Veit: *Med. Klin.*, 1916, xii, 1, 85.
8. Tate: *Am. J. Obst.*, 1918, Lxxvii, 235.
9. Dawes: *Illinois M. J.*, 1918, xxxiii, 171.
10. Bunch: *J. S. Carolina M. A.*, 1918, xiv, 250.
11. Cooke & Mason: *J. A. M. A.*, 1920, Lxxv, 1, 95.
12. Grattan: *Surg., Gynec. & Obst.*, 1919, xxix, 457.
13. Hoffmann: *Arch. f. Gynack.*, 1920, Cxii, 230.
14. Buford: *W. Virginia M. J.*, 1921, xv, 535.
15. De Lee: *S. Clinics N. America*, 1921, i 4, 1003. The Principles and Practice of Obst., 1924, p. 527.
16. Paulus: *J. Oklahoma M. A.*, 1921, xiv, 14.
17. Couvreux: *Progrès Médical*, 1922, p. 459.
18. Szenes: *Arch. f. Klin. Chir.*, 1922, Cxx, 859.
19. Favreau et Chaput: *Progrès Méd.*, 1923, p. 133.
20. Anderson: *Nebraska M. J.*, 1923, viii, 102.
21. Gore: *Southwestern Med.*, 1924, viii, 283.
22. Pribram: *Klin. Wchnschr.*, 1922, i, 1256.
23. Le Filliatre: *J. de méd. de Paris*, 1925, Lxiv, 140.
24. Ficklen: *New Orleans M. and S. J.*, 1925, Lxxviii, 146
25. Caplesco: *Bull. et mém. Soc. nat. de chir.*, 1925, Li, 949.
26. Hipsley: *Med. J. Australia*, 1925, xii, 2,400.
27. Stolper: *Wiener med. Wchnschr.*, 1925, Lxxv 1, & 2, 1370, 2334.
28. Crosthwait: *Texas Medical News*, 1915-1916, xxv, 337.
29. Richardson: *Guy's Hosp. Gaz.*, 1916, 403.
30. Markoe: *Der Frauenarzt*, 1918, xxxiii, 186.
31. Brindeau: *La Clinique*, 1920, xi, 1.
32. Jerlov: *Acta Gynecologica Scandinavica*, 1925, iv, Fasc. 1.
33. De Gironcoli: *Deutsche Zeitschrift fuer Chirurgie*, 1922, CLxxv, 313.
34. Tedenat: *Bull. Soc. d'Obst. et de Gynéc. de Paris*, 1925, xiv, 287.
35. Lemeland et Risacher: *Bull. Soc. d'Obst. et de Gynéc. de Paris*, 1926, xv, 29.
36. Royston and Fisher: *Am. J. Obst. and Gynec.*, 1926, xi, 184, 247.
37. Fullerton: *Ohio State M. J.*, 1926, xxii, 124.
38. Mussey: *Collected Papers of the Mayo Clinic*, 1917, ix, 293.
39. Heineck, A. P.: Personal Cases.

Gastric Lavage and Gall Bladder Drainage

In the Treatment of Diabetes Mellitus

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It is obviously manifest that in patients suffering from some chronic ailment, whether it be of digestive or metabolic nature, or whether it be a disease entity or neoplasm, the condition is bound to have a bearing on the other organs and processes in the body. In other words, no ailment that human flesh is heir to is circumscribed in its effects. In due time mechanically or pathologically, it is bound to react unfavorably on the human economy. And so it becomes impossible to treat a metabolic disease such as Diabetes, especially in its chronic form, without finding all of the digestive organs suffering some unfavorable change. Hence a thorough examination of the patient and, if possible correction of all other deviations from health should be effected before a possible improvement could be expected.

Of especial interest and directly correlated to our subject, is the condition of the upper Gastro-Intestinal tract. Does the stomach secrete the necessary juices and ferments to digest food under normal circumstances? By actual investigation (by Boas-Ewald meal and other methods) we find that most of our diabetic patients suffer from deficient secretion of gastric juices—from a slight decrease to complete achylia. In the majority of cases there is evidence of chronic inflammation of the gastric mucosa. On examination of the stomach contents, muco-purulent masses were found in many cases. On microscopical examination, these proved to be gastric epithelial cells infiltrated with polynuclear leucocytes often containing bacteria—in other words a true gastritis.

In investigating the condition of the duodenum, a much more complicated series of determinations had to be made. The so-called bucket was employed to obtain the contents of the duodenum. Almost invariably, the duodenal juices obtained were deficient in Amylases (the Wohlgemuth method was used), lipases and proteases. Some specimens contained blood. The Lyon (1) method was also employed to ascertain the quantity and quality of bile secreted, as well as the condition of the Gall Bladder and ducts.

Pathology in the Gall Bladder is closely associated with pathological changes in the regional lymphatics, liver and pancreas. There is frequent metastatic involvement of the Gall Bladder via the Portal Vein through the liver, from anywhere in the gastro-intestinal tract; also through the lymphatics of the bile passages and pancreas. The blood sugar determinations in patients with pathological changes in this region varies (2) with the extent of involvement of these lymphatics. Hence it is logically plausible that treatment of Gall Bladder conditions is good prophylactic treatment against Diabetes. In this connection it is interesting to note that Joslin points out that the average age (in his cases) of Gall Bladder disease was 45, whereas that of the onset of Diabetes was 47, indicating a probable temporal and causal relationship between the two conditions. The frequent association of Hyperglycemia with Cholecystitis and pancreatic thickening, leads to the assumption that Hyperglycemia may at least in part be of infectious origin. These features are also associated with diminished Islands of Langerhans, fibrosis of the pancreas, hyalinization of the insular tissue and areas of hemorrhage. Glycosuria occurs in from three to six per cent of these cases (3).

This is usually transitory and recurrent, fluctuating with the severity of the condition. The glycosuria is due to indirect interference with the functioning of the Islands of Langerhans, sequential to pancreatitis, and deficient glycogen storage in the liver due to Hepatitis. Treatment of Biliary tract diseases by non-surgical drainage or by surgery, produces a marked improvement in the sugar picture.

Rabinowitch (4) basing his investigation on the relation of abnormalities in the Biliary system to Diabetes, made a series of determinations for urobiligen to determine the presence of Urobilinemia in cases of Diabetes. He found a high urobilin content in the blood of many of his cases. According to Wallace (5), urobiligen may be formed in the Biliary radicals of the liver only in rare instances of intrahepatic infections, such as Cholangitis. An excessive excretion of urobiligen is seen in (a) diseases of the liver, and (b) in hemolytic diseases. Since a positive van den Bergh reaction (for urobiligen) is indicative of biliary dysfunction, this test might be employed as a routine procedure in the early determination of biliary abnormality for prophylaxis against Diabetes.

The following cases of Diabetes complicated by the presence of other disturbances of the Gastro-Intestinal tract and Biliary system have been selected as typical examples of our series of twenty-two cases.

Case I—Mrs. C. K. Age 44. Widow. This case was under our care for Diabetes for about a year, when she suddenly developed symptoms of obstructive jaundice; intermittent, biliary colic, occasional fever (due to catarrhal cholangitis) and jaundice of varying intensity. Bile was found in varying amounts in the urine and feces. With the onset of these symptoms, there was a sudden increase in the sugar content in the blood—from 180 to 320 mg./100cc. Glycosuria was present varying from ½ to 2%. Since this was not improved by dietary regulation, it was thought that this case might be amenable to Gastric and Duodenal lavage and Gall Bladder drainage, and this treatment was instituted. At the first treatment, we recovered as bile A (see below) a comparatively large amount of thick inspissated bile, which on microscopical examination showed the presence of products of inflammation. Six treatments were administered, and gradually the bile resumed its normal color and consistency. The jaundice disappeared and the diabetic condition was brought back to a state where it could be controlled by dietary regulation and small doses of Insulin.

Case II—Mrs. A. Z. Age 29. Complete hysterectomy 1½ years previous to treatment. The mother died in diabetic coma. This patient is very obese. Blood sugar was 500 mgs./100cc. Glycosuria 5%. Large amounts of Insulin—(60 to 80 units a day)—were administered and strict regulation of diet was resorted to. Still the hyperglycemia was not influence very much, and it was thought advisable to attempt Gall Bladder drainage. After several treatments, the blood sugar began to return to normal and the urine became sugar free. Both of these cases are still under care and are doing well under small doses of Insulin and dietary regulation.

Case III—Mrs. A. Z. Age 58. Chronic diabetic of a mild type for five years. The blood sugar was never above 200. The treatment consisted of small doses of Insulin and dietary regulation. This, however, was not sufficient to remove all of the symptoms—this patient suffered also from generalized furunculosis, prurigo and irregular pains referable to the Gall Bladder region. It was decided to put her on Gall Bladder drainage treatment. She received these treatments twice a week for a period of two months, after which her general condition was much improved. Her weight increased and Insulin was discontinued. The blood sugar returned to normal, the glycosuria disappeared and the skin conditions cleared up.

Case IV—Mrs. F. D. Age 63. Chronic diabetic of a severe type. Hypertension—190/110. Heart enlarged in all diameters. Accentuated first sound. Digestion was very poor and the stomach was dilated. Gastric analysis revealed the absence of free Hydrochloric acid. Combined acids 10. Microscopically, there was evidence of an inflammatory condition of the gastric mucosa. Gastric lavage was instituted twice a week for two months, after which digestion was somewhat improved. Gall Bladder drainage was then employed twice a week for another two months. A strict diet and small doses of Insulin were continued throughout these treatments. The results were gratifying. Polydipsia and Polyuria disappeared. This case is still under our care and is doing well on only restricted diet and very small amounts of Insulin.

Case V—Mr. S. W. Age 65. Teacher. Chronic diabetic of a mild type. Hypertension 200/110. The arteries were moderately sclerosed throughout the entire system. This patient was very emaciated and suffered from severe indigestion. He was afraid to take food due to the severe distress following ingestion. An examination of the gastric contents revealed a condition of complete achylia and products of a severe inflammation of the gastric mucosa. Gastric lavage was utilized twice a week for six weeks until the condition of indigestion was somewhat ameliorated. This was followed up by Gall Bladder drainage twice a week for several weeks, at the end of which the digestion was considerably improved. The appetite was restored and there was a gain in weight of five pounds. Treatment was continued on a restricted diet and small doses of Insulin.

Case VI—Mrs. A. R. Age 42. One of three sisters all of whom are under treatment for diabetes. Her blood sugar was 400. Glycosuria 4%. This patient was emaciated and debilitated. There was Polyuria and Polydipsia, also pain referred to the Gall Bladder region. The usual treatment of Gastric lavage was first employed. Complete achylia was found after the first test meal. The treatment consisted of large doses of dilute hydrochloric acid —30 min. at each meal. Incidentally hydrochloric acid should be taken during the meal and not at the end. The gastric lavage was followed by gall bladder drainage in the usual manner—twice a week for four weeks, at the end of which the patient showed a gain in weight. Polyuria and Polydipsia disappeared. The patient is still under our care and is doing well on a restricted diet and small doses of Insulin.

Case VII—Mrs. C. W. Married, large family. Was brought to the clinic with Diabetic Retinitis. Blood sugar 200. Glycosuria 1½%. The patient was almost wholly blind—she could only perceive light and distinguish gross objects. Under the usual dietetic treatment her general condition improved somewhat, but her eyes showed no change. A gastric analysis revealed improper and insufficient secretion. Gastric lavage was instituted and rather large doses of dilute hydrochloric acid were administered. This treatment was further extended to Gall Bladder drainage. After several months of continued treatment, the condition of her eyes began to show a gradual improvement. At present, all symptoms, especially as regards the eyes are gone. The patient was able to resume her household duties. She is still under treatment—dietary restriction and small doses of Insulin.

A proper physical examination must always precede

the attempted passage of a stomach tube or even a bucket, in order to determine the presence of conditions (such as hypertension, aneursym or marked congestion of the lungs) which would make this procedure dangerous.

Drainage of the Gall Bladder, utilizing the Magnesium Sulfate method (6) is a comparatively easy process, and in a great many cases is diagnostic of the underlying pathological conditions in either the ducts (common, cystic or hepatic) or the Gall Bladder. However in some instances the flow of the bile can not be produced even with the proper installation of the bucket. This may be due to several factors, such as obstruction in the common duct due to the presence of a small stone; or inflammation of the duct; or to pressure from without caused by tumors or adhesions in the vicinity. Again the bile may be markedly inspissated and too viscid to flow.

Copher and Kodama (7) have shown that the tonus of the duodenal wall exerts a regulatory control over the pancreatic as well as the bile duct. A fall in pressure in either duct was found to accompany any relaxation in the tone of the tone in the duodenal wall and vice versa, the pressure in the common duct being the main controlling factor. They showed that anything influencing the tone of the duodenum will also influence the flow of bile and pancreatic juice into the duodenum.

In obtaining duodenal or biliary contents for analysis it is necessary to eliminate contamination from the upper gastro-intestinal and upper respiratory tracts. Lyon (1, 6) advocates the following method for obtaining these secretions without contaminations.

The patient is examined after a twelve hour fast. The mouth, teeth and gums are thoroughly cleansed. The patient gargles first with a strong solution of Potassium Permanganate (one grain to the ounce) and then with a mild solution of Zinc Chloride. The duodenal tube is freshly sterilized by boiling. Then the patient swallows the bucket. The fasting residue from the stomach is aspirated and set aside for examination. The stomach is then rinsed to sparkling clearness, made astringent with Zinc Chloride solution, and thoroughly rewashed. Often after the administration of the Zinc Chloride, we recover muco-purulent plugs which in some cases show masses of gastric epithelial cells infiltrated with small round cells and polymorphonucear leucocytes. The stomach is then disinfected by passing 250 cc. of Potassium Permanganate (one to ten thousand) in. This is immediatey recovered and the stomach again washed clear.

The tube is now ready for passage into the duodenum. To pass the sphincter rapidly, the tube must be swallowed slowly. A little water is left in the stomach to increase the efficiency of peristalsis. The patient lies on the right side and very slowly swallows an additional twenty cm. of tubing, to a total of 75 to 80 cm. from the incisors. The duodenal contents is then aspirated and set aside for examination.

Normally under these conditions, the duodenal juice is grey, translucent and distinctly mucoid, but does not contain the sticky stringy strands of mucus (which some consider normal) unless there be present a catarrhal condition. The amount of duodenal secretion normally obtained is about ten to twenty cc. If bile is present it is an indication of physiological dysfunction of the Sphincter of Oddi. Abnormally the microscopic findings on examination of the duodenal juice will reveal large masses of exfoliated duodenal cells (30 to 40 cells to a low power field being considered normal). There will also be found evidences of inflammation. To verify that the tube is in the duodenum, we can aspirate a small amount of the contents and get the reaction—alkaline, or we may determine the location of the bucket by means of the fluoroscope.

After removing the contents of the duodenum, we run in about 75 cc. of a three per cent solution of Magnesium Sulphate. This is the proper concentration for the optimum contraction of the viscus and relaxation of the sphincter. In about five minutes we start to aspirate. Normally we obtain back the solution injected, tinged with bile—indicating that the sphincter is relaxed. The relative concentration of the bile gradually increases until we obtain only pure bile. There is a gradual transition from the first bile—called "Bile A"—which comes from the bile ducts, to the more viscid and more deeply colored "Bile B" which comes from the Gall Bladder proper. This bile is allowed to drain until a third transition is reached—"Bile C" which is freshly secreted from the liver. The three types of bile are collected in separate vessels.

In our series of analysis of the material obtained from the duodenum, we have the following results:

Patency (of Sphincter of Oddi)			Amylase	Lipase	Protease
Normal:	Not	Patent.....	Av. 40	Av. 1½–2	Av. 4–10
Case I.	Patent	.....	8	1	3
Case II.	Patent	.....	14	1	5
Case III.	Not	Patent	10	¾	6
Case IV.	Patent	.....	19	1½	7
Case V.	Patent	.....	27	1	7
Case VI.	Patent	.....	12	¾	4
Case VII.	Patent	.....	18	1	8
Case VIII.	Patent	.....	9	¾	6
Case IX.	Patent	.....	22	1½	9
Case X.	Not	Patent	32	¼	2

In the determination of the amount of Amylase present in the duodenal fluids, the Wohlgemuth (8) method was employed. The Lipase content was determined by treating two tubes each containing 1 cc. of duodenal juice with 10 cc.. of distilled water, 1 cc. of Ethyl Butyrate and 1 cc. of Toluene. One tube is boiled, and the other incubated at 38° for 24 hours. Then each is titrated (Phenolphthalein Indicator), the difference being the value recorded. The Protease (trypsin) content was determined through the utilization of the Casein method (8). Bassler outlines a new method for the determination of the Amylase content of the duodenal juice. He takes the results obtained on the amylase determination as an indication of the efficiency of the Pancreatic function. He checked the proteolytic, lipolytic and amylolytic activity in a series of several hundred cases and found them to run parallel, hence he claims that a determination of one is a sufficient index of pancreatic activity. Crohn (10) states that the earlier methods, such as the Casein test for trypsin, and the Wohlgemuth test for amylopsin are more easily carried out and give fairly accurate results.

In cases of inflammation of the bile ducts, Bile A is more viscid than normal and contains flaky mucus which makes it appear turbid. It also contains pus cells, epithelial cells, red cells, and occasionally pathogenic bacteria. In a condition of Choecystitis, where the bile ducts are normal, Bile A is relatively normal, but Bile B from the Gall Bladder is turbid, very viscid and contains flakes of stringy mucus and inflammatory elements. The color varies from a deep yellow to a greenish black. Normally we obtain 5 to 30 cc. of Bile A in about five minutes after injecting the Magnesium Sulphate; Bile B—30 to 70 cc. in ten to fifteen minutes, and Bile C—several ounces as long as it is allowed to drain.

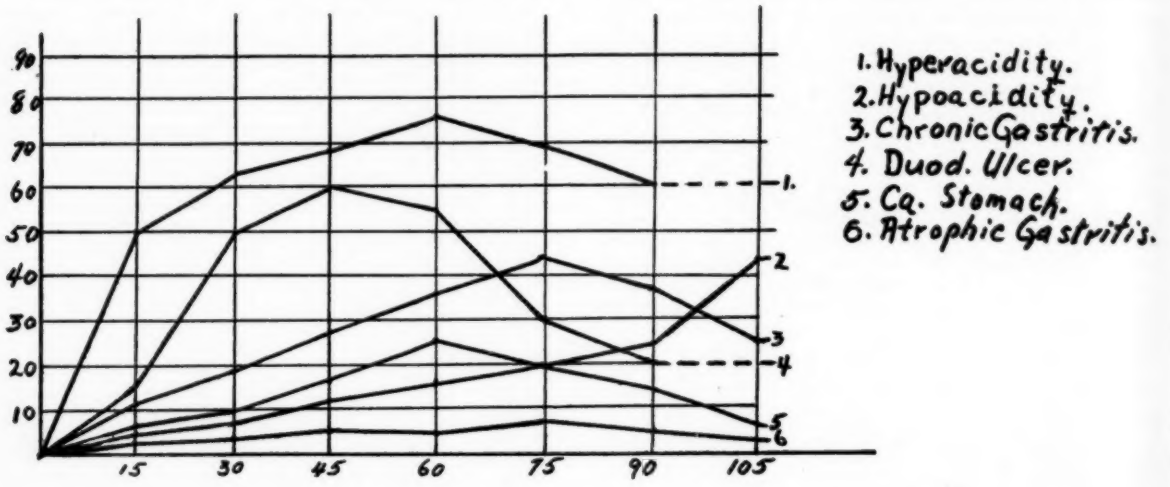
In a previous paper, (10) we have shown that default of the body in dealing with Carbohydrate, producing a decreased sugar tolerance, and Hyperglycemia, may be indirectly produced due to abnormality in the stomach. Excess mucus as in chronic catarrh, will interfere with

proper ac. secretion. Since the acid derived from the gastric mucosa is the stimulus for the secretion of pancreatic juice into the duodenum, it is quite logical to expect that though the pancreas be normal, the body will manifest abnormality pointing to pancreatic insufficiency —all due to lack of proper stimulus. Hence it is essential to make a proper gastric analysis in cases of Hyperglycemia, in view of ameliorating the existing condition, and also as regards prophylaxis against Diabetes. Subsequent to our paper on this subject, Bowen and Aaron (11) reported a series of fractional gastric analyses on 60 Diabetics. The results they obtained were similar to our results as regards gastric secretion. They also claim that it is justifyable to assume that achlorhydria may be the result of long standing Diabetes.

The gastric function is usually determined by means of a test meal, so adapted as to bring about the usual response of the stomach to a type of food customarily taken. To determine a condition of retention, a meal of rice and raisins may be given the evening before the examination, and if there be retention, the raisins will be recovered in the stomach contents. It is essential that no food or water be taken for a period of 12 hours preceding the examination. On the morning of the examination, one of the standard meals, (such as Boas', Ewald, Dock, or Fischer) is administered. The meal may be removed en toto at the end of 50 or 60 minutes, or by the fractional method (employing here the Rehfuss tube and bucket—the same as used in draining the Gall Bladder). In cases of dilatation we recover besides the meal administered, food remains of previous meals (and raisins if given the night before). This is indicative of motor insufficiency due to pyloric obstruction or gastric atony. Normally we recover varying amounts up to 80 cc. on total removal. If above this amount, it is indicative of either retention or hypersecretion. Floating mucus is probably freshly swallowed—from the respiratory tract. Viscid stringy mucus is usually associated with the absence of or diminished free HCl. Blood in the contents removed (determined chemically by the Guaiac or Benzidene tests) is not indicative of ulcer or neoplasm unless confirmed by a careful history physical and X-Ray examination, since its presence may be due to congestion and diapedesis, or to minute erosions.

The following is a series of curves obtained by fractional removal of the stomach contents in various pathological conditions. Normally, the maximum total acidity is between 60 and 70, and is reached 60 to 75 minutes after ingestion.

The type of curve obtained is indicative of the pathological condition present. In case of a pathological condition outside the stomach, as in duodenitis, duodenal ulcer, or appendicitis, there will be hypermotility and hypersecretion in the stomach. Pathologically we find in the residue of the fasting stomach, besides the remains of food, bile salt crystals from regurgitated bile, leucocytes, indicative of inflammation (always in large amounts in cases of gastric ulcer or gastritis) and large amounts of erythrocytes. In cases of decreased acidity, or total lack of acidity, there is present in the gastric contents several varieties of bacteria, among which are those of the Boas-Oppler type. This variety was formerly supposed to be pathognomonic of Carcinoma.



In a previous communication, we are somewhat agreeably surprised with the results obtained from gastric lavage and the administration of comparatively small doses of dilute HCl in chronic Diabetes. Reasoning along the same lines we decided to determine the general condition of the duodenum, its patency and the character of its secretion. We found as surmised, that in some cases, the pyloric valves did not function properly and that the secretions were less in amount than normal. A great deal of mucus, debris and products of inflammation were also obtained here.

The following table shows the results obtained in our series of Gastric analyses:

GASTRIC CONTENTS

	Free HCl	Total Acidity	Pepsin	Microscopic Findings
Normal:	30–40 cc. N/10	50–60 cc. N/10	8–11	
Case I.	5 cc.	12 cc.	9	Inflamm. Products. Mucus.
Case II.	0 cc.	8 cc.	8	Inflamm.
Case III.	2 cc.	9 cc.	10	Inflamm. bacteria.
Case IV.	3 cc.	15 cc.	10	Inflamm.
Case V.	4 cc.	11 cc.	9	Inflamm.
Case VI.	2 cc.	14 cc.	7	Inflamm.
Case VII.	8 cc.	22 cc.	11	Inflamm. slight increase.
Case VIII.	0 cc.	6 cc.	5	Marked excess of mucus and inflammatory products.
Case IX.	6 cc.	9 cc.	9	Excess mucus. Slight increase in inflammatory products.
Case X.	7 cc.	16 cc.	9	Excess mucus. Slight increase in inflammatory products.

It will be evident from the above that it is impossible to approach the treatment of any chronic condition, from

(Concluded on page 294)

The Role of the Differential White Blood Count in Surgery

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It was in the year 1835 that Nassé (9) did the first recorded differential blood count. From that date until 1905 very little significance was placed on such counts by medical practitioners and less by surgeons. A leucocyte count alone had an indefinite value. Da Costa (7), in 1899, recommended that blood counts be regarded as a symptom. Bloodgood (1), in 1901, warned surgeons that a sudden drop in the white count called for immediate operation in acute abdomens and believed that the lower the white count the less favorable the prognosis. Cabot (2), in 1904, said that "leucocytosis meant pus."

Joy and Wright (13), in 1902, summarized the beliefs of their day in the following manner: "It is only within a comparatively short time that surgeons have begun to realize how much valuable information in the fields of diagnosis and prognosis can be obtained from an examination of the blood. Although the student of internal medicine long ago learned to attach much importance to the facts disclosed by such an examination, the surgical side of the profession has maintained a rather indifferent or even skeptical attitude, assuming that data obtainable by other means at their command were sufficient to guide them in the management of their cases; they have regarded blood work as something good enough in its place and probably of use to physicians, but unnecessary to the more or less skillful surgeon. As the result of this indifference it has happened that hematology has occupied a place of minor importance."

In 1904, McCoskey (16), suggested the use of the differential blood count because of what it might reveal in the future. His basis was that when suppuration occurred the cells were usually neutrophilic in type.

One year later, 1905, F. E. Sondern (21a) of New York, ushered in a new era of thought. He brought to the attention of surgeons the significance of leucocyte counts and the associated importance of differential counts.

The cardinal principles of Sondern's (21a) work, based on more than 1,000 cases are:

1. The degree of leucocytosis is evidence of body resistance.

2. The increase in the percentage of polymorphonuclear cells is an indication of the severity of toxic absorption.

3. Purulent exudates are rarely if ever present with low percentage of polymorphonuclear cells irrespective of the height of the leucocyte count, while very high polymorphonuclear percentage almost invariably indicate their presence even if the total leucocyte count is low.

Many surgeons throughout the country began to employ both the leucocyte count and the differential count; and confirmatory reports of Sondern's views were forthcoming. Gibson (11), of New York, in 1906, expressed himself very emphatically when he said, "the differential blood count and its relation to the total leucocyte count is the most valuable diagnostic and prognostic aid in acute surgical disease furnished by any means of blood examination. It is of value chiefly in indicating the existence of suppuration or gangrene, as evidenced by an increase of the polymorphonuclears disproportionately high as compared to total leucocytes. The greater the disproportion the surer are the findings and in extreme disproportions the method has proved itself practically infallible."

Gibson also devised a method of recording findings on a graphic chart. In order to have standards to work with he took 10,000 white blood cells as the highest normal leucocyte count, and 75% as the highest normal percentage of polymorphonuclear cells in the differential count. Then with each rise of 1,000 in the leucocyte count there will be a proportionate rise of 1% in polymorphonuclears, thus:

NORMAL W. B. C.	RATIO Polys.
10,000	75%
15,000	80%
20,000	85%
25,000	90%

In 1910, Dexter (5) said of the first five years since Sondern's original article, "There are some points that bear repetition and emphasis. Prominent among these is the fact that in theory and in practice, at debate, and at the bedside, there is such an intimate relation and interdependence between the differential and simple white blood count that their values cannot be discussed separately."

From 1910 until the present time there has been more or less of a lull in interest concerning the problem of differential counts.

I have studied a series of five hundred cases of appendicitis and its complications taken from the records of the Episcopal Hospital to see how the results check up with the work of Sondern and Gibson. The cases studied were all those over a given period of time that had both white counts and differential counts made.

Before discussing the findings there are several terms that ought to be discussed.

Leucocytosis, according to Cabot, is the presence in the blood of an increase in the number of the white blood cells of the same varieties morphologically as those in normal blood, a plurality, and generally an overwhelming plurality, being polynuclear.

Technique

A differential count means the percentage of the various types of white blood cells, classified by De Boe (6) as:

1. Small lymphocytes.
2. Large lymphocytes.
3. Transitionals.
4. Neutrophiles.
5. Eosinophiles.
6. Basophiles.

Sondern (21a) puts the normal percentage of each as:

1. Small lymphocytes	28%
2. Large lymphocytes	7%
3. Polymorphonuclears	62%
4. Eosinophiles	1%
5. Basophiles	0.7%
Leucocyte Count	6,700

Taking the table already given as the normal ration of total white cells to percentage of polynuclears present, then a "falling line" means a rise in the leucocytic

count out of proportion to the percentage of polynuclears.

A "rising line" means a rise in percentage of polynuclears disproportionately above the leucocytic count according to the ratios given in Gibson's chart.

A differential count, though relatively simple to do, demands a certain definite skill and careful technique in order that the full reliance can be placed upon it. Merely the placing of a drop of blood in any manner on a cover of glass and staining it and counting 100 cells will not give a really accurate differential count.

Napier (19) states that it is on the method by which the cells are counted that doubt is cast. He says "we must have a standard film counted by a standard method." His method is to use cover slides and make a careful smear 2x2 cm., counting every cell, 400 cells should be counted at least. The common sources of error, according to Napier (19), are:

(a) Personal—Individual complex.
(b) Mechanical—Method and technique.
(c) Numerical—Mathematics.

Johns (14), in another article, adds this warning—"Do not disturb the distribution of the leucocytes; They should be 5-8 red blood cells thick and at least 300 should be counted."

Therefore, before accepting the value of any blood work, especially a differential count, we should make sure that all sources of error are eliminated.

CLASSIFICATIONS

The cases now being reported have been classified as follows:

1.	Chronic appendicitis	184
2-3.	Acute appendicitis (mild and severe)	98
4.	Gangrenous appendicitis	48
5.	Diffuse peritonitis	75
6-7.	Appendiceal abscess (large and small)	45
8.	Complications	37
9.	Post-operative cases	18
		505
	(Less five cases which appear in two classes such as acute appendicitis and then later developed pneumonia)	5
		500

The average count for each group was:

		W. B. C.	Diff.
1.	Chronic appendicitis	9,710	70%
2.	Acute appendicitis (mild)	10,870	73%
3.	Acute appendicitis (severe)	13,750	83%
4.	Gangrenous appendicitis	19,110	90%
5.	Diffuse peritonitis	16,000	88%
6.	Appendiceal abscess (large)	21,470	84%
7.	Appendiceal abscess (small—localized)	17,200	80%
8.	Complications	13,980	84%
9.	Post-operative cases	13,490	75%
10.	Deaths	14,690	85%

In Chart I are shown the average counts in each of the groups above noted.

Groups I, II, VI, VII and IX show falling lines.

Groups III, IV, V, VIII and X show rising lines.

In Chart II are shown the actual counts in ten typical cases which were selected from the various groups.

	Typical Cases.	W. B. C.	Polys.
1.	Chronic appendicitis	10,000	75%
2.	Acute appendicitis (mild)	18,800	83%
3.	Acute appendicitis (severe)	12,300	86%
4.	Gangrenous appendicitis	34,560	91%
5.	Gangrenous appendicitis	18,320	96%
7.	Diffuse peritonitis	23,200	95%
6.	Diffuse peritonitis	34,400	86%
8.	Diffuse peritonitis	9,840	98%
9.	Appendiceal abscess (large)	15,520	92%
10.	Appendiceal abscess (small—localized)	20,400	85%

The cases from Groups I, II, IV, VI and X show nearly horizontal or falling lines, while the cases from Groups III, V, VII, VIII and IX show falling lines.

In Chart 3 are shown the counts of the two cases of peritonitis to demonstrate the prognostic significance of a falling and a rising line.

	W. B. C.	Polys.	Result.
1.	9,840	98%	Died
2.	34,400	86%	Recovery

(Counts made one day before operation in each case.).

Gibson and Sondern believed that the greater the disproportion the more severe the condition and the worse the prognosis.

In Chart 4 we have taken ten cases each of generalized peritonitis and gangrenous appendicitis and charted them to emphasize the prognostic value of a rising and falling line.

No.	Condition	W. B. C.	Diff.	Result
1.	General peritonitis	9,840	98%	Died
2.	General peritonitis	19,760	97%	Died
3.	General peritonitis	11,520	96%	Died
4.	General peritonitis	26,880	96%	Died
5.	General peritonitis	16,320	95%	Died
6.	Gangrenous appendicitis	19,900	94%	Died
7.	General peritonitis	15,860	93%	Died
8.	General peritonitis	19,200	93%	Died
9.	General peritonitis	15,600	91%	Died
10.	General peritonitis	15,920	91%	Died
11.	General peritonitis	25,000	87%	Recovery
12.	General peritonitis	22,960	87%	Recovery
13.	Gangrenous appendicitis	34,560	91%	Recovery
14.	Gangrenous appendicitis	23,040	87%	Recovery
15.	Gangrenous appendicitis	20,700	85%	Recovery
16.	Gangrenous appendicitis	34,640	80%	Recovery
17.	Gangrenous appendicitis	24,160	84%	Recovery
18.	General peritonitis	22,400	73%	Recovery
19.	General peritonitis	27,280	90%	Recovery
20.	Gangrenous appendicitis	18,640	81%	Recovery

Of these twenty patients, the first ten all showed rising lines and all died, while the second ten, all of whom showing falling lines, recovered.

In this series of cases of appendicitis, pus or a gangrenous process was found in 94% of all those showing a differential polynuclear count of over 90% and in 79% of all cases with a count over 85%. This shows that a differential count of over 90% almost invariably indicates pus or a gangrenous process regardless of the leucocytic count.

The rising line, which is significant of the severity of the infection, and indicates a bad prognosis, occurred as follows:

Diffuse peritonitis	88%	cases
Gangrenous appendicitis	77%	cases
Severe acute appendicitis	76%	cases
Large appendiceal abscess	68%	cases

At once, several questions are raised: Why, in spite of the rising line in the majority of our cases, did the patients get well? The answer seems to lie in the fact that with operative intervention either drainage of fluid or pus was established or a gangrenous appendix or tube removed.

Another question is, why cannot the surgeon obtain enough data for diagnosis and treatment from the general physical examination and the patient's condition without the aid of a blood count? Many cases are confusing, and the findings on physical examination do not always indicate the pathological condition found. For example:

Mrs. K., age 44 years, entered the Episcopal Hospital 11-5-26, having been sick for only five hours before admission. The condition started with vague pains in the abdomen. She was slightly tender over the appendiceal region on admission but no distension was present and no definite mass could be palpated. Her general condition seemed fairly good. The temperature was 99°, blood count 10,800 with 93% polys. Postponement of operation was thought permissible, but when done, fourteen hours after onset of symptoms, turbid fluid with a gangrenous appendix was found. Here there was no suggestion of such a pathological condition from the physical

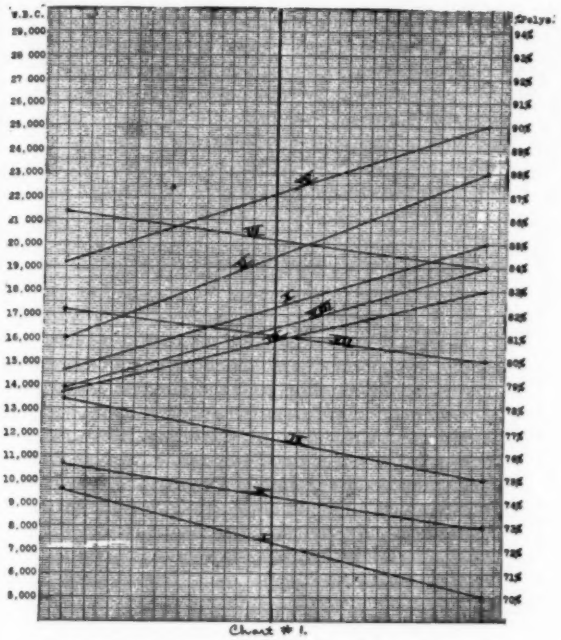

CHART NO. 1.—AVERAGE COUNT FOR EACH GROUP

Average counts of each group charted according to Gibson's method, i.e., Percentage Polys, on R. and leucocytes on L. of mid-line using Gibson's chart as basis.

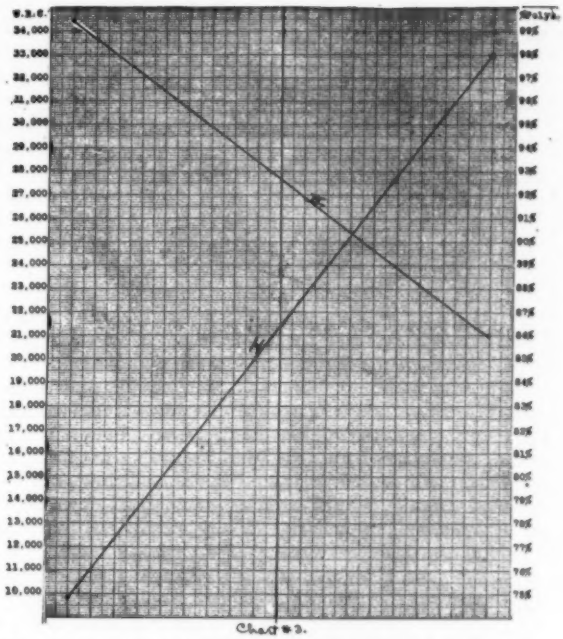

CHART NO. 3.—TWO CASES OF GENERALIZED PERITONITIS

Two selected cases of generalized peritonitis which shows the prognostic significance of Gibson's chart.

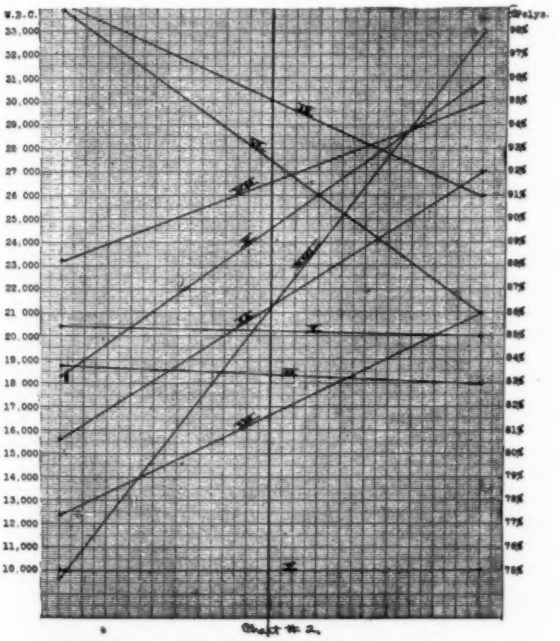

CHART NO. 2.—TEN TYPICAL CASES (SELECTED)

Ten various cases selected and charted according to Gibson's method, to show the advantage of charting; also illustrating rising and falling lines.

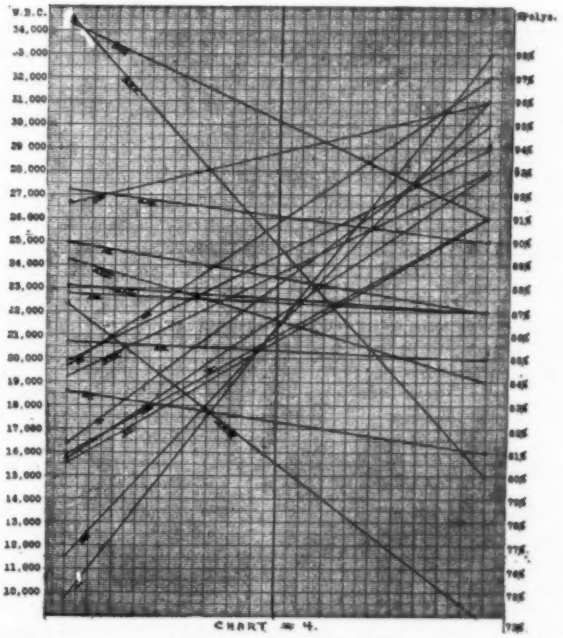

CHART NO. 4.—TWENTY CASES—GENERALIZED PERITONITIS AND GANGRENOUS APPENDICITIS

Twenty cases which have been charted to show confirmation of Sondern's hypothesis.

examination or from the general condition of the patient. Patient fully recovered.

Conclusions

A study is presented of the blood counts, (total white cell count and polynuclear percentage) in a series of five hundred cases of appendicitis in the Episcopal Hospital. These five hundred appendiceal cases are not all the appendiceal cases admitted during the period of time selected, but only those cases in which both a white and a differential count was made. These examinations were not made in all cases admitted.

Our findings confirm the views of Gibson and Sondern in all respects.

Leucocytosis alone means very little as there is such a wide variation due to the patient's resistance. Mauriac and Cabout (17) found a normal range of from 12,300 to 6,500 at an interval of thirty minutes; thus showing the possible fluctuation in a normal individual.

These results are offered, not as a proof, but as a further confirmation and an added stimulus for further study and work.

Sondern (21e) himself said 'I beg to repeat that laboratory methods no matter how important, are aids only to the physician; they are not intended to replace his clinical and diagnostic skill or his prognostic ability based on clinical experience."

Jones and Brown (15) well expressed the fact which this series of cases has proved—"We must evaluate all blood work with clinical history and physical examination."

An old motto is very fitting as a closing thought—"The man who makes every diagnosis in the laboratory is as short sighted and liable to grave error as the man who ignores microscope and test-tube."

To Dr. A. P. C. Ashhurst I wish to express sincere thanks for his inspiration, guidance and criticism in the writing of this paper.

BIBLIOGRAPHY.

1. Bloodgood, J. C.: Blood examinations as an aid to surgical diagnosis, *American Medicine* 1:806—808, 1901.
2. Cabot, R. C.: The diagnostic and prognostic importance of leucocytosis, *Boston Medical and Surgical Journal* 130:277-282, 1894.
3. Cooke, C. O.: The value of the differential leucocyte count in acute surgical diseases, *Yale Medical Journal* 14:12—29, 1907-1908.
4. Cherry, S.: The differential leucocyte count as a diagnostic aid, *Maryland Medical Journal* 53:207-210, 1910.
5. Dexter, T. H.: The interpretation of a differential leucocyte count, *New York State Journal Medicine* 10:127, 1910.
6. De Boe: Significance of differential count, *Journal Florida Medical Association* 2:294 (Apr.), 1916.
7. Da Costa, J.: *American Journal of Medical Sciences*, 117-118: 654, 1899.
8. Goodall, A.: Clinical lecture on the leucocyte as an aid to diagnosis and prognosis, *Medical Press and Circ.* London 95:598-600, 1913.
9. Galt, H. M.: On the value of the blood count as an aid to diagnosis in obscure bacteriological and other infections, *British Medical Journal*, London 2:1367-1369, 1913.
10. Greely, H.: Differential count in diagnosis and treatment, *Medical Record*, 97:348 (Feb.), 1920.
11. Gibson, C. L.: Value of the differential leucocyte count in acute surgical diseases, *Annals Surgery* 43:485-499, 1906.
12. Holmes, A. M.: The nature and significance of leucocytosis, *Journal A. M. A.* 44:257-263, 1905.
13. Joy, H. M. and Wright, F. T.: Leucocytosis as a point in prognosis in appendicitis, *Medical News* 80:628-634, 1902.
14. Johns, F. M.: Differential leucocyte count and its interpretation, *New Orleans Medical and Surgical Journal* 62:332-336, 1914-1915.
15. Jones, W. C. and Brown, C. E.: Clinical significance of total and differential leucocyte counts with special reference to acute infections, *American Journal Medical Sciences*, 164:553-573, 1922.
16. McCoskey, G. W.: The diagnostic value of leucocytes, *American Journal Medical Sciences* Phila., and New York, 128:1048-1058, 1904.
17. Maurice and Cabout: Variations in leucocyte count in normal, Paris Medical Abstract in *J. A. M. A.* July 2, 1921—72.
18. Monroe, H. E.: The leucocytes and their diagnostic significance, *Illinois Medical Journal*, Springfield 7:268-270, 1905.
19. Napier, L. E.: Differential blood count, *Indian Medical Gazette*, Calcutta, 57:176-179, 1922.
20. Piney: Hematology, *British Journal Surgery*, July, 1926.
21. Sondern, F. E.:
    (a) The present status of blood examination in Surgery, *Medical Record* 62:452-455, 1905.
    (b) The present attitude of blood examination for diagnostic purposes. *Boston Medical and Surgical Journal* 93:690-692, 1905.
    (c) Value of blood count in Sepsis, *New York Medical Journal*, 83:1245, 1906.
    (d) The value of differential leucocyte count in diagnosis, *American Journal Medical Sciences* 132:889-891, 1906.
    (e) Value of leucocyte count in diagnosis of acute inflammatory disease, *American Journal Surgery*, New York 21:366-368, 1907.
22. Sil, J.: Leucocytosis in purulent infections, *Detroit Medical Journal*, 5:193-195, 1905-1906.
23. Ulrich, H.: The value of differential leucocyte counts, and a new chart for recording same, *New England Medical Gazette* 48:113-116, 1913.
24. Wile, I. S.: The value of differential leucocyte counts in medicine, *New York Medical Journal* 85:453-455, 1907.

The Rectal, Vaginal and Abdominal Examination During Pregnancy and Labor

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Introduction: Nearly one hundred years ago, Velpeau advocated "rectal touch" as a means of examination during labor, but it has been only within the past decade that this method of investigation has been receiving the attention it rightfully deserves. Velpeau, in the preface of his celebrated "Treatise on Midwifery," translated by Charles D. Meigs in 1838, said: "I have added a great deal to the article on touching and have endeavored to show the advantage of touching by the rectum, as well as of abdominal exploration, in a vast number of cases."

Even this outstanding figure in obstetric work, whom Meigs said: "stands scarcely second to any pysician in Europe," hardly appreciated the advantage of the measure he advocated and which is gradually receiving wider and wider adoption in the practice of obstetrics today. Velpeau could hardly foresee the gradual abandonment of vaginal examination as a routine procedure nor did he likely conceive of the gradual substitution of the abdominal method for both the vaginal and rectal examination in routine obstetric work.

If patients are properly studied during the antenatal period, especially primigravidae, in whom with the advent of lightening the fetal head gradually sinks into the pelvis, I can see no valid reason why either a vaginal or rectal examination should be made during the course of normal labor.

If one realizes, as recently emphasized by Porritt, that the cervix, an insignificant portion of the uterus projecting into the vaginal vault, plays but a passive role in labor and that the essential phenomena of this process are carried on by the great muscular organ in the abdominal cavity, the uterine body, more and more the study will be directed to the abdominal wall and less and less to the vaginal canal.

I am fully persuaded that in the great majority of cases labor can successfully be supervised by limiting the examination to the abdominal wall. This is especially true if during the latter weeks of the antenatal period the accoucheur finds on *rectal examination* the fetal head in the pelvic cavity.

I am quite convinced that rectal and, especially, vaginal examination should not be employed as routine measures during normal labor, but limited to those cases exhibiting definite complications.

Vaginal Examination During Pregnancy: In considering the above heading at this time, it may have the appearance of placing the cart before the horse, but it is necessary to discuss the topic in this manner in order to analyze systematically and in sequence the place of the procedure in pregnancy and in labor.

In considering this feature of the matter three questions arise:

1. When or how soon in pregnancy should the examination be made?
2. How often should it be repeated?
3. When or at what stage in pregnancy should it be discontinued?

It was formerly taught—and this teaching still prevails to a considerable extent—that in most cases an

internal examination should not be performed during the first visit of the patient. This teaching—still advocated by many eminent men—was founded on the assumption that the patient might not be properly prepared and further that it increased the natural timidity and fear. It was, also, taught that postponement of the procedure to some subsequent visit afforded the patient an opportunity to become acquainted with the physician and acquire confidence in his skill thereby.

It was for a long time, likewise, believed that under no circumstances should a patient be examined, save in the presence of a third party, but this teaching is now obsolete.

The reasons set forth by the advocates of postponement, I think, can be wholly dismissed with the statement that rarely do they hold true.

It is my experience that nearly all patients look forward to both a complete external as well as internal examination during the first visit. For this reason their natural timidity or fear is curbed and besides, they come, as a rule, properly and adequately prepared.

Since it is now customary, even for the general practitioner, to provide a nurse or attendant, the matter of the presence of a third party does not call for further comment.

It is my personal belief that ninety-five patients out of every hundred expect a complete examination during the first consultation and largely for the express purpose to learn whether pregnancy actually exists. Obviously, this condition can not be determined in any other way.

An exhaustive investigation of the patient on the first visit, it seems to me, affords a great many advantages. The physician is enabled thereby, not only to determine the existence of pregnancy, but whether or not it is in any way complicated. It is by this method alone that one is able to determine whether the gestation is within or without the uterine cavity and only by this method is one able to recognize complications such, for example, as pelvic or genital deformity, venereal infections or neoplasms.

Postponing the vaginal examination is not founded on true merit, but rather on custom. Occasionally, a patient may object to an internal examination during her first visit for some personal reason, but rarely on the ground of modesty, timidity, lack of confidence in or familiarity with the doctor consulted, as has been so long assumed.

There are very clear reasons why the internal examination should be performed at the time of the first antenatal inquiry. First, it is well to keep in mind that by this method only can an early pregnancy be recognized. In many instances the patient is exceedingly anxious to have her suspicions confirmed at the first consultation and, as a rule, this is her chief reason for visiting the doctor early.

In the second place, it is by vaginal examination alone, as I have already stated, that one is able to determine if the pregnancy is intro-uterine or extra-uterine. One can not possibly recognize complications such as venereal infection, serious pelvic deformity, genital anomalies or neoplastic disease by any other method.

In order to emphasize the importance of routine examination at the first consultation, I beg to submit briefly the following clinical records.

I. Recently, a patient was admitted to my service with signs of grave intra-abdominal disease. Her skin was pallid, blanched, cold and clammy. A few hours before admission she suffered an agonizing attack of pain in the left lower abdomen, followed by the symptoms enumerated above. With this combination of phenomena a tentative diagnosis of a ruptured tubal pregnancy was made and, accordingly, an abdominal operation was performed immediately. The abdomino-pelvic cavity was literally inundated with blood and a fetus, ten centimeters in length, was found suspended from a large ragged rent in the left Fallopian tube.

The patient had been seen by a prominent physician on two occasions at least, but she had not been examined. A history of spotting preceded the tragic stage of her trouble by some days, but this her doctor regarded, she said, as a sign of threatened abortion.

II. Several months ago, a patient was referred by the medical directress of one of our local hospitals. She had been seen previously by a prominent obstetrician in a neighboring city. A careful clinical record was taken. She was told that she probably was pregnant and, though she complained of bladder dysfunction, amounting at times to complete retention, she was not examined. Later I was asked to see her with the view of determining the cause of her vesicle disorder. At the time of my visit, she was suffering with acute retention and catheterization was performed. A careful internal examination was made and this not only disclosed an early pregnancy, but a large collection of uterine myomas. The patient, a primigravida, in her thirty-sixth year, was exceedingly anxious for a child and she was, therefore, allowed to go to full term at which time an elective Cesarean section was performed combined with a multiple myomectomy. The uterine myomas were obviously responsible for the repeated attacks of urinary retention from which the patient previously suffered.

III. Another patient, with a cyst of the left ovary, illustrates, also, the importance of an early and complete investigation. This patient, thirty-three years of age, was admitted to my service with a history of four months amenorrhea. She had been seen by two physicains, but had not been examined. For some weeks prior to her admission to the hospital, she complained from time to time of rather vague but severe discomfort in the left lower abdomen and pelvis. She cited this history to her family doctor, but no examination was made to determine the cause of the distress.

On admission to the hospital a vaginal exploration disclosed a globular mass, comparable in size to a large orange, impacted in the left pelvis and surmounted and compressed by a pregnant uterus. An ovariotomy was performed. The pregnancy continued and the patient was delivered normally at term.

With respect to the repetition of vaginal examination, I personally believe the recourse should be practiced with every return visit of the patient. By some this plan may be regarded as of doubtful utility, but on several occasions I have been able to detect and, I believe, prevent a symptomless oncoming abortion or miscarriage.

Recently, the daughter of a prominent physician came under my care. She was exceedingly anxious to "raise a family." She had been married for four years, but she had not conceived. To favor fertility she had even submitted to one abdominal and two minor pelvic operations. Finally, she consulted me and stated that her last menstrual period occurred two months before. Examination disclosed an early pregnancy.

The patient was seen every four weeks thereafter. On each occasion an internal examination was made. Her health during this time, I might add, was excellent. On her return visit at the end of the twenty-fourth week, an internal examination disclosed the cervix dilated to the extent of three centimeters. The membranes, in conical or watch crystal form, were bulging and the

fetal head was presenting in the dependent bag of waters. There was no discomfort nor was there bleeding of any kind. The patient was taken home and placed in bed with the foot of the bed elevated. She was kept under the influence of sedatives for several days. The cervix partially closed, but not completely. About the twenty-eight week she went into labor and delivered herself spontaneously of a live girl baby. Despite the premature expulsion of a far from mature child, it is, I am glad to say, now living and well.

It may be of interest to state that while this patient was under observation, two similar cases were being cared for in my Department in the Jefferson Medical College Hospital. These two patients were, likewise, kept at absolute rest in bed and both were delivered normally at full term.

If, occasionally, one is able to preserve a human life, is not the routine practice of vaginal examination during the antenatal period really worth while? I feel very strongly on this point. I am quite convinced that vaginal examination should be performed every four weeks and not limited, as is frequently advised, to one investigation in the early weeks of pregnancy and another a short time before full term. Of the objectionable features of this method of investigation, the one advocating an examination just a short time before full term is the worst.

There is still another question relating to vaginal examination during the antenatal period calling for discussion, namely: "Should the precedure be performed in patients approaching full term or in those near labor?" This interrogation must be unreservedly answered negatively. *I am familiar with no method of study which carries greater danger to the mother, both from the standpoint of morbidity and, possibly, mortality, than the careless and oft-times unskilled vaginal examination in patients near or especially in labor.*

As a matter of reiteration, I wish to state that it is my custom to examine every expectant mother, unless there be some special objection, on the day of the first consultation and every four weeks thereafter until the eighth or eighth and a half month, or in other words until the thirty-second or thirty-fourth week.

It has been convincingly demonstrated that the practicetice of vaginal examination in patients approaching or near full term is not without danger and especially not without danger of infection. It is for this reason chiefly I teach, as well as practice, that vaginal manipulation should not be performed after the thirty-second or thirty-fourth week. The preferable method of study after the period named by far is through the rectal canal and it is now my custom to utilize this method alone. I think it is quite well worth while to remember, also, that in the vast majority of cases neither the vaginal or rectal examination is necessary at all.

If in the latter weeks of gestation the presenting part is found low and well fixed in the pelvic cavity, it is obvious that the vaginal method could safely be ignored. Moreover, I am learning to rely more and more on abdominal palpation. Both in teaching and in practice, this recourse is being advocated and utilized.

In primigravidae, near or at term, provided the head is low in the pelvis, I can see no reason whatever for either a vaginal or rectal examination during labor.

It is quite safe to say that ninety to ninety-five per cent of maternity patients can successfully be supervised by abdominal examination alone. Since prevention is now occupying a high place in obstetric work, the not far distant future, will, I believe, see greater emphasis placed on this mode of investigation.

Rectal Examination:—During recent years this method of investigation has gained—and quite properly too—wide recognition in obstetric work. The growing popularity of the procedure with its wider adoption is justly deserved and in many, if not in most, well regulated maternities, it is the method of choice. Only in frankly complicated labor is the vaginal method utilized and then only with due regard to the principles of asepsis, both with respect to the preparation of the accoucher and patient.

I am fully convinced that if the rectal method were given universal precedence over vaginal palpation, not only in institutional practice, but especially, in general obstetric work, it would contribute in a very large way in diminishing the inordinately high morbidity and mortality prevaling throughout all sections of our Country.

It is in this connection that I would beg to enter a plea for the abandonment of the vaginal method as a routine recourse, not only during uncomplicated labor, but in all patients approaching or at full term. If the factor of safety is conserved by utilizing rectal investigation during the progress of labor, would not the factor of safety be enhanced by employing this mode of study in patients in whom labor is approaching or impending?

It is now my custom to set aside vaginal manipulation after the thirty-second or thirty-fourth week and employ the rectal canal for study almost exclusively. After the head is found, as it usually is in primigravidae in the pelvic cavity in the latter weeks of gestation, even the rectal procedure may be abandoned and all studies thenceforth may safely be limited to the abdominal wall.

Vaginal Examination: Reference has already been made indirectly to the disadvantages associated with vaginal manipulation in patients approaching or in labor. There remain, however, certain features of the matter still calling for consideration.

Despite the almost universal condemnation of the procedure, there are still many eminent obstetricians who tenaciously cling to the practice. The argument set forth by those who use the method is that in their hands one vaginal examination provides more information than four or five explorations made through the rectal canal. On the other hand, those men familiar with the rectal method claim, so far as providing information is concerned, they observe very little if any difference, in the great majority of cases.

The principle objection, however, to the vaginal method is the certainty of an increased morbidity and no doubt under certain conditions an increased mortality.

It is only just to say that in safe hands the measure is equally safe, but safe hands are only provided by men well trained in aseptic surgical technic, in other words the expert obstetrician. They alone "know how," but it is, also, right and proper to say that these men deal with only a very meagre percentage of the nearly two million labors which occur annually in this country.

The teaching of the proponents of vaginal examination is not consistent nor is their attitude in strict accord with their practice.

In writing or in debate they extol the virtues of the method in one sentence and proclaim its dangers in another. If the procedure is not a menace and without real danger, why should they feel any concern or hesitate to perform abdominal delivery, for example, in patients who have been examined vaginally once, or repeatedly prior to coming under their care?

It is in the hands of the busy general practitioner,

(Continued on page 294)

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Some Plain Words

The Volstead law lacks the respect of about half the people. "It represents the will of the people of many States as formulated by the Anti-Saloon League. The will of the people of other States is set to break or change it."

It is an interesting fact that as the people in general divide on this question, so the medical profession divides. About half the profession is "dry" and about half "wet"—for the expedient use of which stupid terms we duly apologize.

It would seem that this division of the profession is political rather than scientific, just as with the people as a whole.

Now it is our conviction that an overwhelming majority of the profession is well aware of the great therapeutic value of alcohol, in certain of its forms, in particular clinical circumstances, but that this knowledge plays practically no part in the political considerations given by such physicians to the subject under discussion.

It seems to us that a body of men who are really scientific in spirit would not for a moment permit political considerations to influence their clinical opinions.

We should rather see the profession lined up 100 per cent against the use of alcohol in disease, if such an attitude truly represented the science and art of medicine, than we should to see it split 50-50 for political reasons.

Suppose there were a political aspect to digitalis; how absurd it would be to see the profession splitting on the question of its value in certain forms of cardiac decompensation.

It is such tests as has been afforded by prohibition that reveal the degree to which physicians are fundamentally scientific in spirit.

What the present severe test reveals is not creditable to the profession; the simple man in the street is disclosed under the habiliments of science, as these fall away from him—a self-betrayal which should not be possible among an educated and supposedly high-caste group.

A great body of truly scientific men would never think exactly as the whole people think upon any essentially technical question related to the practice of their art.

For the average "wet" physician we have as much contempt as for the average "dry" one, for it is politics and not science that determines his position on this question.

The professional group that has reached final conclusions on this subject chiefly on the basis of science must be a very small one.

These are serious words, but we believe our premises and reasoning to be sound and are therefore prepared to accept any and all consequences for taking the profession to task on this point.

"Try Bowling"

The viciousness of our prevailing psychology with respect to health is well reflected in the current advertisement: Try Bowling for what Ails You. The assumption here is that something ails everybody and that everybody is actually aware of the fact.

One can hardly defend himself against the innumerable suggestions that are made to one at every turn that one's health is not all that it should be.

The present-day attitude with respect to the reasonable integrity of one's body is highly morbid.

We wonder whether there are any persons left in the world whose personal attitude in these matters is altogether wholesome?

Our considerations of this subject boil down to this: Are there any healthy persons in the community?

We hope that the pre-clinical goblins won't get us for uttering these heretical thoughts.

Keeping Our Heads

It is interesting to note that despite the leaps and bounds with which physical therapy is making a triumphant progress in these modern days, the profession is keeping its head with respect to drugs. One would suppose that the present intensive employment of physical therapy apparatus would tend to distort the old values. There is, on the contrary, a sane use of reliable remedies along with physical methods. As a rule, new fashions in medicine retire or overshadow quite definitely resources that are frequently superior to the novelties, but a new spirit seems to rule to-day, and the wise man who is applying diathermy and the ultraviolet rays is also meeting therapeutic indications in classical ways. This is very much to the credit of the medical profession and means besides that patients are not defrauded of their therapeutic due.

Sickness Costs

The percentage of the total population of the country sick at any one time is about two in every hundred, which means about 2,000,000 people altogether. In large cities as high as fifteen per cent of the sick go to hospitals.

According to Dublin, the annual cost of illness in this country is in excess of $2,000,000,000. The average doctor's income is about $3,000 a year. The average cost of illness for a family is about $80 a year.

It is prolonged sickness and operations of an exceptional nature that are constituting the severest strain on the middle class to-day.

Hospital costs, however, are only part of the general difficulty of the middle class. The housing of this class is increasingly bad, its rents are mounting, and its domestic help is disappearing.

There seems to be a notion that the middle class can be rescued from its plight, but there is a change going on in the social order which may well spell the annihilation of the middle class as hitherto known. Our industrial democratization will in the course of a few generations tend more and more strongly to wipe out the middle class.

As a matter of fact, as pointed out by Dr. MacEachern of the American College of Surgeons Directorate, charges to hospital patients have advanced only 65 per cent since 1913, while hospital costs have advanced 135 per cent in the same period of time. The inability of the middle class to meet this situation easily is eloquent proof of its exclusion from a proper share in the profits of our system.

It is notorious that college education is to-day possible only through the endowment of education. The student pays nowhere near the cost of his education.

Life itself will only be possible to the middle class of the near future through its endowment. And what social forces are interested in such an idea, or in command of riches sufficiently great to put it into effect?

Bertrand Russell conceives of the society toward which we are rapidly moving as one in which the physical comfort of the masses of standardized people will be much greater than it is to-day; health will be vastly improved and death under fifty rare; the birth rate will be properly regulated; the feeble-minded will be largely eliminated; infant mortality will be reduced to almost negligible proportions; there will be no poverty; the fears that plague men to-day will have passed away and hence there will be no armies of psychopaths; society will be composed of industrial barons at the top, the standardized masses at the bottom, and a comparatively small group of retainers among whom will be the scientists who will apply science and hygiene intensively and successfully; there will be no war, because the whole world will be industrialized in common; this one common interest—industrial activities—will mean the sacrifice of such things as art, while the hospital, as we know it now, will be an archaic institution and the problem of costs will not exist.

Meanwhile, as under the Roman Empire, the middle class appears to be meeting its fate in dumb resignation.

Schemes to relieve the plight of the passing middle class as regards hospital costs can, in the present nature of things, be only palliative.

Gastric Lavage

(Concluded from page 286)

the point of view of a single disease entity. In treating metabolic diseases in general and Diabetes Melitus in particular, the condition must be reviewed from many angles, and a thorough and exhaustive examination made of the entire gastro-intestinal tract. The kidney must be examined not only from the standpoint of Glycosuria, but also from the functional standpoint—by an examination of the blood to determine the presence of any retention. Also the liver and rectum must be examined to determine and if possible to remove any abnormality.

REFERENCES.

1. Lyon, B., *Jour. Am. Med. Ass'n.*, Jan. 24, 1920., p. 74, 246.
2. Barber, W. H., *Jour. Am. Med. Ass'n.*, Nov. 13, 1926. p. 1653.
3. Smithies F., *Jour. Am. Med. Ass'n.*, Nov. 13, 1926. p. 1659.
4. Rabinowitch, *Brit. Jour. Exper. Path.*, 7:156-60, June, 1926.
5. Wallace and Diamond, *Arch. Int. Med.*, June 15, 1925.
6. Lyon, B., *Am. Jour. Med. Sci.* Sept., 1925, p. 150, 402.
7. Copher and Kodama, *Arch. Int. Med.*, 1926, p. 652-3.
8. Meyers and Fine, *Ess. of Path. Chem.*, pp. 25, 26.
9. Bassler A., *Arch. Int. Med.*, 35:162-76. Sept. 15, 1926.
10. Schultz, S. R. Gastric Lavage in Glycosuria, *Med. Times*, June, 1926.
11. Bowen and Aaron, *Jour. Am. Med. Ass'n.* July 24, 1926. p. 274.
12. Rose, *Arch. Inst. Med.* 1910. Vol. V. p. 459.
13. Best, *Am. Jour. Med. Sci.* Dec., 1920.
14. Rehfuss, *Am. Jour. Med. Sci.* 1914 p. 857. Am. J. Med. Ass'n p. 1534. ibid Aug. 14, 1920. ibid Feb. 5, 1921.
15. Jarno, *Wiener Klin. Wchnschr.*
16. Pilcher, *J. A. M. A.* Nov. 19, 1910.
17. Rehfuss and Hawk, *J. A. M. A.* Feb. 5, 1921.
18. Rutz, *N. Y. Med. Jour.* Oct. 23, 1920.
19. Jutte, M. E. *N. Y. Med. Jour.* Mar 16, 1912.
    J. A. M. A., Feb. 22, 1913.
    Am. Jour. Med. Sci. May, 1917.
20. Sachs, A. *Neb. State Med. Jour.* Aug., 1921. p. 6. No. 8, p 2.25.
21. Soper, H. W. *Am. Jour. Med. Sci.* Aug., 1918. p. 156. No. p. 205.
22 Howell, Textbook Physiol. W. Sanders Co. p. 776.

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Rectal and Vaginal Examinations

(Concluded from page 292)

the man who of necessity is one third obstetrician, that the maneuver is unsafe. This is especially true of the physician who in routine medical work encounters almost daily all types of infectious disease and who, besides, has not been adequately trained in the practice of aseptic technic.

There is still another phase of this subject calling for discussion. I refer to the pernicious tendency—once the fingers are within the vaginal canal—"to help the patient." With the cervix dilated there seems to be an irresistible impulse on the part of the attendant to further dilate, stretch or slip the anterior lip of the cervix over the presenting head. How frequently and how widely the cervix is lacerated by this futile and dangerous procedure is impossible even to conjecture, but this unfortunate result, as bad as it is, by no means is the chief danger.

I am familiar with no procedure that may inflict more damage than the pernicious habit of attempting to manually dilate or slip the thin and delicate cervix over the baby's head.

Under normal circumstances, the cervix should receive very little, if any, injury, and in this connection I might parenthetically say that the two outstanding causes of cervical damage are, first, the pernicious practice of the manipulation mentioned and, second, lack of judgment in interpreting the indications for, and improper technic in the application of forceps.

It is exceedingly important to vividly bear in mind that the cervix, especially the multiparous cervix, is literally *a hornet's nest*, teaming with a great variety of bacteria and, hence, the extent of trouble provoked by the maneuver must in some cases of necessity be wide spread. It is this feature of vaginal manipulation that is most reprehensible and naturally fraught with untold danger.

Finally, as a matter of re-emphasis, I wish to state I am fully persuaded that vaginal examination should not be employed as a routine measure *during the course of normal labor*, but limited to those patients exhibiting definite complications.

In the vast majority of patients, the vaginal method may with safety be replaced by rectal manipulation and the interest of nearly all can best be served by limiting the examination to the abdominal wall alone.

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What Price Health?

"The biggest bill the taxpayer has to meet is due to the care of the sick; the biggest bill the individual has to meet in unhappiness, ineffectiveness and failure is due to that individual's lack of real health; both bills can be tremendously reduced by a well organized, well executed program of positive health."—*Dr. Ellen C. Potter, Pennsylvania State Department of Health*

The Rationale of the Newer Medicine

MARK H. SMITH, M.D.
Los Angeles, California

(Continued from page 258, November issue)

XIII.

Elements unite through definite activity, otherwise inertia occurs.

Nitrogen has often been called inert. Rather than this, it is remarkably active. It gives to responsive compounds, as ammonia, activity and specific privileges.

In any liberation from an association, there must be an altered potential. Reactivation occurs through a readiness to respond to adjusting states. This is due to some factor which seizes upon an absorptive property, as in nitrogen, which alters potential, and, in response to this activating quality, nitrogen or other element enters within or parts with some combination.

The apparent lack of stability in nitrogen is due to its quickness in adapting to an environment of altered potential. This produces inactivation and reactivation. This really constitutes the elastic response that is shown by nitrogenous compounds to the effects of oxidation, or as commonly called, metabolism. The great value in nitrogenous compounds resides in the factor of active response to conditions of environment, which we call adaptation. This is the real factor for rendering proteids of such incomparable flexibility for organic use.

Activation is a specific power and governing influence, serving to adapt the cell to influences in environment. Liberty in selecting an adaptable route, facilitating activation, and answering the requirement of ease in mobility, makes the nitrogenous issue, urea, of such value to the human cell.

The ionic value in nitrogen is basic. Nitrogen exists in hermetic isolation until activation endows it with responsive ability. In this way is its subtle power engaged.

The affinity of nitrogen for combination reposes in the altering of potential of the elements with which it is combined. The various proteins are as specific in influence upon the cells, as any element entering into organic structure.

Dispossession of an existing potential is the striking characteristic of the various proteids, which undergo changes from both local and general disturbances. These disturbances are a matter of cell environment, which creates loss in insulation and discharge of potential.

An adaptation of the cell to the process of organic life involves the co-operation of nitrogen. This applies to any one or more of its many forms, as it occurs, in proteid, hydro-carbon, carbo-hydrate, or associated or intermediary forms or compounds.

The ratio of the nitrogen present has a marked effect upon the reaction of compounds. Ammonia citrate solution of eight per cent, when injected, produces severe reaction, but increase of its nitrogen percentage removes the allergy that occurs from the weaker ratio.

Evolution has only been possible by directing a course along lines of least resistance. It is this which offers the minimum of disadvantage to cellular existence.

The development of CO and NH_2 methods for eliminating waste, as occurs in the human organism today, has the advantage of direct routing. It claims all the perceptible benefits for adapting the cell to minimize the detrimental features of endogenous change.

Electro-potental releases a maximum of available energy, and offers the minimum of resistance to function. The selection or occurrence of other standards of potential rating has resulted in the creation, course and typing of other species of organic life.

Bicarbonate is held by simple complement within the blood plasma concentration that is adapted to the needs of cell life, as in the human species. It has been, and continues to be, the most suitable H ion concentration for needs of present existence. Through this concentration, as alveolar reserve, the human cell has been delivered along its most progressive lines, despite the history of long exposure to recurring and disturbing effects in environment.

The CO combination is acceptably the basic, metabolic form for the transference of organic waste. It has a definite potential. It is eliminated with apparent ease, through the alveoli or by other routes, and expresses an affinity for mating with the hypothetic radical, NH_2, in the production of urea. In its transfer to the point of discharge, it is held virtually inocuous, by the guarding quality of oxygen, in the combination of CO_2.

Electro-potential depends upon a disparity which exists between opposing polarities, shown in the potential difference that exists, for instance, between acids and alkalies. This is originally measured in the activity of protons and electrons. The same manifestation occurs in the activation of all organic structure, and represents a process that governs the construction of all synthetic compounds.

Urea is inocuous to the organic cell, because of some complement. It is easily excreted through the physical properties of high solubility and division to ultra-microscopic colloidal size (amicronic), permitting ease of transfer through the minute interstices of cell wall.

This method for disposing of waste designates an acceptable and tolerable route for proteid exchange, as well as for cell replenishment with various elements, such as occurs in nutritional supply, intake of oxygen, metabolic exchange and transudate of various secretions, as in elimination.

Urea does not further hydrolize; in consequence, it appears as the terminal effect of hydrolysis, to the presence and effects of which the organic cell must have earned an adaptation, with determination to minimize its disturbing effects.

Urea preserves a definite, colloidal integrity, quite evidently displaying a standard for cell porosity. This persists under the definite standards of organic existence, as a condition of environment, and is utilized as the method for measuring advantages to be found in a definite H ion concentration.

Operative simplicity is the real demand of chemic law. This emphasizes the need for harmony of association in organic life, which provides an architecture for the vertebral cell.

A hall-mark for structural perfection and stability of form is woven in the synthetic pattern of urea. When held in tolerable amount in the cell, urea is normally balanced and conducted through excretion. Excess in retention of urea, or its related compounds, produces general disturbance as a toxicity, which is usually

clearly depicted as an allergic manifestation. Low concentration in retention of these compounds may remain concealed under generalized terms or indefinite diagnoses, such as "asthenia, shock, uremia, allergy, acidosis," or other similar terminology.

Synthetic construction represents a natural, organic process. It is commonly observed occurring in plant cells, which respond to the effects of activating rays, with the production of metabolism, or an oxidation occurring in the presence of chlorophyll. Inasmuch as chlorophyll is absent from the animal cell, a substituting process of synthetic construction is required.

Handled in the form of urea, proteid debris occurs as the least harmful form of waste. In itself, urea is a stimulus for allergic occurrence, and institutes a metabolic reflex in the form of oxidation. The form of refuse, in the composition of urea, is that which induces a natural need for allergy, to continue the processes of life. These are required to be stimulated by some factor which induces change in potential. This is an allergic effect, and in the normal state of the animal cell, as in the human species, urea has become an adaptable agent for inducing this effect.

So distinguished and yet normally inocuous is urea within the cell of man, when not present in excess of normal threshhold, that manufacturers avail themselves of the advantages contained within the formula, to synthetically prepare remedies that are agreeable to the cell. These give a broader application for therapeutic attack, without adding injury to existing damage located within "acidic" or traumatized cells requiring remedial benefits. More direct effects ensue through benefits in this form of medication, than from any formerly directed relief. It guides an approach through normal processes, and assists cellular invasion whereby the allergic effect of drugs may be attained, the whole process being, of course, the institution of some allergic stimulation, or method of activation. The influence that reposes in this carefully conducted form of campaign, conforms to natural cell methods, being based upon normal, functional advantages that are inherently adapted to the progressive activity of the cell itself.

Misdirected metabolism is a misnomer. The condition that is present is one of cell retention, in excess of threshold tolerance, of alien forms, producing cellular overstrain, indicative of local allergic disturbance, and in excess of normal concentration. This involves urea as an agent, under certain conditions, capable of instituting cell distress and adding to cell strain through over-burdening. As has been reiterated, this ensues through alteration of cell complement in some form, as changed potential and diminished activation. The cell standard for normal existence has undergone alteration.

XIV

Within itself, urea is not conducive to pathological allergic effects. There is required cellular trauma from other factors. To the state of "acidosis" thus induced, urea adds a plethora of accumulation.

When normally held by complement, and under conveyance to synthetizing cells and excretory membranes, the formative elements of urea are held captive without the irritative effects which create allergy.

Proteid normally enters the cell in a harmless form, and through the provisional control of some guarding complement. When subjected to the effects of metabolism, proteid waste is converted to urea forms.

When fault occurs in this cycle of events, there occurs the opportunity for retention of irritating forms, with "acidic" effects. This institutes the "sensitization" form of allergy, just as occurs from the injection of protein, and the alteration of H ion concentration.

Primary and secondary forms of protein result from different degrees of hydrolysis of the protein molecule. Primary proteins, meta-proteins, alkaline proteins or albumins, are created by the action of enzymes or hydrolase. This is the institution of altered potential, or change in complement, with a separation of proteid into one of two general groups, which are called specific and non-specific.

As secondary derivatives of protein, peptones follow upon an intensive hydrolysis of protein, potential change occurring to an advanced degree. Digestive enzymes act to hydrolyze the protein molecule, and split the cell to form a characteristic structure. It is to be remembered that a certain state of activation is the standard for definite potential.

The validity of the proteomorphic theory in the production of immunity, must depend upon a recognition of the effects from variety in protein. The response that occurs in chemic effect, with a loss in or alteration of potential, synonymous with an altered activation, becomes the regulating factor.

Simple proteins, as protamines, alcohol-soluble proteins, globulins, albumenoids, gluteins and histones, yield amino-acids in response to the effect of hydrolysis. Alcohol, for instance, produces temporary allergy, and temporary cell waste, as evidenced by the appearance of casts in the urine. This is the effect of some solution of complement in the blood, an altered potential, or change in activation, and there results the effect of changed relationship, normally associated cells in tubules being released thereby.

"Acidosis" as a result of alcoholic indulgence depicts cellular change through loss of binding element in complement. Minor "acidosis" is the effect of the release of some specific complement which holds normally accepted protein in standard form. A toxicity occurs in the change, such as ensues upon minimal effects of introduction of proteid by parenteral route.

Splitting meta-proteid to a secondary form is the process that proves incentive to the appearance of allergy. This may be added to in the further splitting of the proteid form, with a requirement of the organism to resort to assisting methods of defense. These are the accessory measures for eliminating waste. The saliva becomes "acidic," even to reddening litmus paper; urinous or acetous breath, or uric odor to perspiration, retention of CO_2 in excess, diminished intake of oxygen and increased concentration of renal secretion, are signals of systemic intolerance employing unusual routes for elimination, and advertising the advanced degree of "acidosis" that is present. Possibly cell trauma has occurred to such serious degree that repair to normal health standards is no longer possible.

Cell states of normality, with corresponding elimination of CO_2 and NH_2 forms, represent the standardized H ion concentration. Deviation from this normal standardization signifies the presence of "acidosis", "alkalosis", or similarly related states, definite with the degree of disturbance to the standard accepted state that occurs.

Muscle change, hepatic activity and accessory elaboration by the kidney, are accepted sources for the appearance of urea. Undoubtedly still other structural cells will be found endowed with the functional privilege of protection, through synthetic evolvement of the compound.

Defective metabolism, as an under-reduction of proteid or other molecular form, as in under-oxidation, results in lessened production of urea. The result shows in an accumulation of such products as oxybutyric acid or allied compounds, with the allergic manifestation that is sometimes called "ketonuria".

Digestive errors provoke the formation of acids in the intestine. This may result from decomposition of or fermentation of enteric contents, with formation of indoxyl-sulphonate or related forms, which bear a resemblance to the chemical formula of oxybutyric acid.

As a result of defective elimination, such as may occur with interstitial nephritis, indol often accumulates, to evince the effect of a depravity in oxidation processes in the organism.

Regardless of any diagnostic significance in the presence of interstitial nephritis or any other state, with indol present, allergy exists. This may be to such degree that localization in cell change exists as the nephritic condition or other systemic defection. Often there is an absence of subjective distress or objective disclosure, with a diagnosis unmade until some revelation occurs as in blood pressure elevation, or other minor but continued symptomatology, directing attention to the provoking factor.

Extra-renal and not renal causes increase urinary ammonia. The normal kidney eliminates ammonia through normal function, in response to the influence of some complement that is supplied from an extra-renal source.

Waste is normally carried through the process of osmosis from renal cells, toward negative pressure, or into renal tubules, much the same way that CO_2 is eliminated by the pulmonic cell. The function of the kidney cell for wasting NH_2 compounds proves to be as specific a function as that of the lung cell for transfer of CO_2 without the blood stream.

Cells reflect the influence of the plasma, which bathes them. Disturbed blood concentration exerts an influence upon systemic cells. Cell adjustment to the effect of H ion concentration is necessary. Through the influence of the plasma, endogenous supply of "acidic" forms must have an effect upon cellular states.

Any approach to "acidity" of the plasma is allergic in effect, creating defensive conditions within secretory, glandular and protective organs. In cell proteid undergoing hydrolysis, there is a confirmation of this, as in the conversion to primary and secondary forms of protein.

Defective metabolism, resulting from the influence of localized or diffuse effects of allergy, affects complement. Potential becomes altered, the mineral threshold of the cell and of the blood is altered, and, as well, the activity of ferments and enzymes is subjected to change.

XV.

Merumowicz found the rhythmic response of cardiac structure only occurred when certain inorganic salts were present in the blood serum. Loeb and Lingle showed that this was based upon the presence of salts, as ions, in definite proportion and balanced solution.

Loeb found that essential salts act in combination with proteids and fatty acids, as "metal proteids or soaps," the definite proportion being a phenomenon which governs life processes.

Howel found that heart response depends upon the presence of some stabilizing substance which unites at the end of diastole and disassociates or becomes inactivated with the occurrence of systole.

Erlander found the lipoid, cuorin, in heart muscle. Cuorin is allied to lecithin, containing two phosphorus radicals in place of one. Cuorin shows a direct affinity for oxygen, oxygen presence being necessary for the activation of this representative of the lipoid family, and, being so intimately related to all cardiac expression.

Cuorin is only found in cardiac structure, and is distinguished in its capacity to form compounds with potassium, sodium, calcium and other elements, illustrating its specific display in chemic effect and molecular adaptability.

When existing singly in organic cells, salts are poisonous. However, in combination with one or more elements, salts prove beneficial to holding cells.

Decreasing alkalinity of the heart decreases the conduction time of cardiac muscle fibres, quickening systole. Contrarily, increasing the alkalinity of the heart lengthens systole, and may cause the ventricle to precede the auricle in contraction, as may ensue upon the administration of barium chloride.

Ringer and Howell found that calcium antagonized potassium effects upon heart rhythm, while Lingle and Loeb found that sodium was necessary for cardiac contraction to occur.

The question of the influence of mineral forms upon the heart response is of less significance than the point that release of energy only occurs through the supply of some lipoid which is essential for activating cardiac structure.

Within the organism, lipoids vary as greatly as do glandular or organic functions which provide lipoids, or which, in turn, respond to the activating effects of these substances.

Lipoids occur in many forms of atomic combination, bearing a definite proportion to the amount of lecithin or kephalin that is found, as in egg-yelk, in the brain, liver, heart, lung or other organic structure or substance, which either supply lipoidal element, or reflect functions in response to the presence or activity of such compounds.

All animal organs contain certain lipoids which are peculiar to the structure in which their privileges are exploited.

Phosphatids, when present in organic cells, occur as lipoids, this being without regard for organic source or composing elements. The effect is an activation, such as supply of complement.

Certain lipoids antagonize the activities or the effects of other lipoids. The entire field of organic activity is thoroughly covered by the functional variety of this class of organic compounds.

Bacteria contain lipoids, often in a form that contributes a specific method of defense for the germ-type supplied thereby, and which serves to protect the aggressive properties of bacteria against the attack of phagocytic or other functional properties of organic cells. This is markedly shown in the instance of the tubercle bacillus, which contains a powerful lipoid, which has the effect, as one of its properties, of defeating the dissolving activity of the lecithin in animal cells, which aims at the dissolution of the structure of alien proteid.

Lipoids are not separable from vitamines. Vitamine medication is lipoidal influence, as in the treatment, for instance, of avian polyneuritis, by administration of vitamines.

Lipoids have the effect of providing solubility for alkaloids, the organic effect created by "lipo-solubility" being the influence, as activation, of cells to medicinal effect, with the prolongation of remedial influence. This is a form of treatment which has a new field for study and exploration, introducing a wholly altered survey for organic relief. Investigation shows that this method of treatment is that of using natural methods for cell endorsement, relieving cellular allergy through the induction of functional response, the drug effect being restoration of potential to the cell.

Organic response is dependent upon the supply of essential, activating lipoidal element. For instance, menstruation is a functional process through a correct lipoidal influence.

Pregnancy only occurs through a change that ensues in lipoidal supply to the uterus. Vitamine supply is a nourishing factor, of specific influence in the occurrence of pregnancy, and in the conduction of the gravid uterus to term.

The contribution of a correct lipoid, through the uterine circulation, produces proteolysis of the uterine decidua. Removal of detritus, by natural methods, from the uterine cavity, decidedly influences the progress of menstruation, fertility of the uterine soil being essential to the progress of conception to term. The change that occurs in the corpus luteum is due to lipoid conveyed from the ovary. The corpus luteum has a decisive influence in producing the uterine decidua. Alteration of the ovarian lipoid affects uterine function.

Decline of the corpus luteum, with its mission of conception occurrence unfulfilled, reflects an altered activity in its affiliated ferment, or ovarian lipoid. Succumbing to the effects of this lipoid, the corpus luteum, which has had the effect of promoting ovarian activity, in turn suffers demise and removal, with the consequent appearance of a large amount of lipoid in the menstrual flux. Thus the alteration of proteid is produced by the effect of lipoids upon the uterine substance and mucosa.

This effect finds duplication in other parts of the organic structure, wherein lipoids change proteid structure. For instance, lobar pneumonia depicts the effect of altered lipoid supply and lipoidal influence upon pulmonic structure. The limitation of the infection and pathologic effect to the inflammatory process confined within a single lobe shows the striking effect of lipoidal change upon nerve control. This is similar to the effect shown in herpes, with limitation of the inflammatory and degenerative effect, as an allergic disturbance, to areas of nerve coursing.

XVI.

Lipoids are influenced by, and in consequence reflect the effects of certain elements upon organic structure. This is markedly shown by the remedial benefits from Ringer's or normal salt solutions.

It will be remembered that Ringer's solution was used by Hering to restore and maintain the human heart beat eleven hours after death occurred, and that Kuniabko used the same formula to successfully restore systole to the heart of the dog, several days after the appearance of death.

These responses can only be derived through the influence of some agent that exists within the heart structure, and which causes the cardiac muscle to institute its function of contraction, with rhythmic reactivation of the process.

These influences, too, as shown by the experiments mentioned, resist for a certain time at least, spontaneous disassociation of structural elements. The local cardiac influences mentioned fail to respond to the effect of exogenous stimulation, as the electric current, or change in cell insulation from decomposition of contiguous structure, but activation does ensue from certain ionic contribution, as that conveyed through Ringer's mixture.

It is evident that the elements that compose this mixture have earned a marked toleration upon the part of the heart centers, proving most adaptable to the neuromuscular combination, for reactivation occurs in response to the concentration present in the mixture.

Specialized heart structure, partaking of both neurogenic and myogenic qualities, exhausts all the available energy of the ventricle in each systole. This indicates that disassociation occurs with release of some complement which had been in course of development for producing contraction adapted to the vertebral type. This

(Continued on Ad. page 24)

The Physician's Library

Minor Surgery. By Arthur E. Hertzler, M.D., F.A.C.S., Chief Surgeon Halstead (Kansas) Hospital, and Victor E. Chesky, A.B., M.D., F.A.C.S., Chief Resident Surgeon Halstead Hospital; with 438 illustrations; pp. 568, including an index; C. V. Mosby Company, St. Louis, Mo. 1927.

This book holds fast to all things in the domain of minor surgery that have proven good. It is extremely practical and therefore there is no reference to pathology. The dispensary student, the interne and the general practitioner will alike find it most useful. The illustrations are good and a surprising range of subjects is covered. The book can be recommended unreservedly.

Feeding and the Nutritional Disorders in Infancy and Childhood. By Julius H. Hess, M.D., Professor and Head of the Department of Pediatrics, University of Illinois College of Medicine, etc.; 45 engravings in the text and one colored plate; pp. 566, including an index. F. A. Davis Company, Philadelphia. 1927.

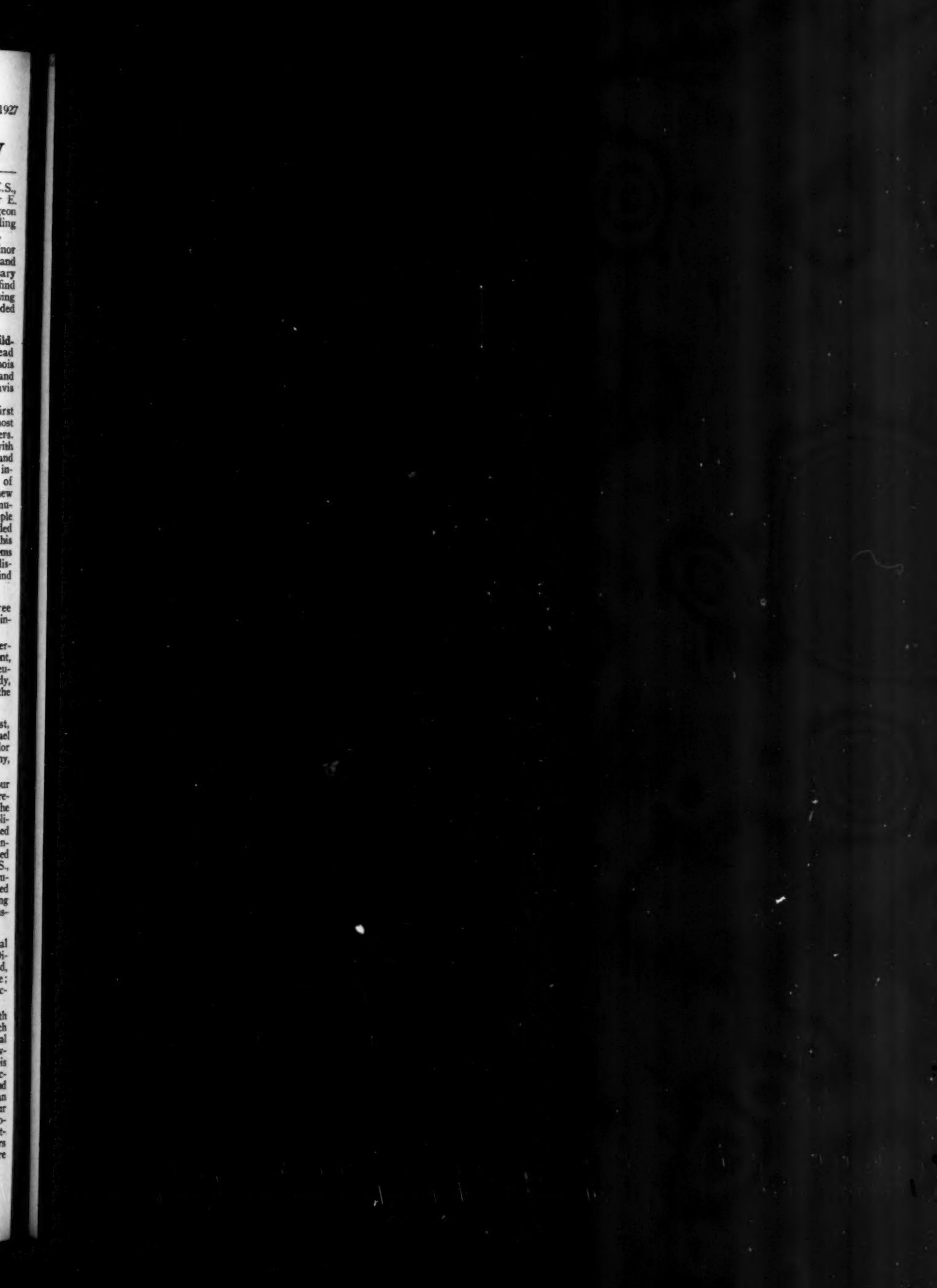
This is the fifth edition of Hess's well known work, first published in 1918, which continues to hold its place as a most excellent manual on infant feeding and nutritional disorders. The latest researches are taken into account, particularly with respect to rickets, scurvy, spasmophilia, acidosis, alkalosis and the anemias. Dietetic requirements of children up to and including the sixth year are set forth in this edition. Much of the older material has undergone extensive revision. A new chapter features celiac disease. The work successfully formulates the rules which govern the practical application of simple milk mixtures with carbohydrates added, all advice being founded upon clinical experience. The practitioner may look to this book as a wholly dependable guide in all his feeding problems and in the clinical phase of his work with the nutritional disorders. The teacher and student of pediatrics will, as well, find it one of the indispensable manuals.

International Clinics; Vol. III; thirty-seventh series; three colored plates and thirty-five plates and figures; J. B. Lippincott Company, Philadelphia and London. 1927.

The twenty eminent contributors to this volume of the International Clinics present ten papers on Diagnosis and Treatment, one on medicine, one on surgery, one on obstetrics, one on neurology, one on medical history and two on post-graduate study, all of a high order of excellence. This old friend among the periodical publications sustains its good record.

Gonococcal Infection in the Male. By Abraham L. Wolbarst, M.D., Urologist and Director of Urologic Clinics, Beth Israel Hospital, etc.; with 89 illustrations, including seven color plates; pp. 237, including an index. C. V. Mosby Company, St. Louis, Mo. 1927.

Gonorrhea, considered as a pathologic entity, demands our most serious study, and Dr. Wolbarst's book provides a comprehensive presentation of this important subject. Herein is all the knowledge that the earnest student could wish for. The application of physical therapy (diathermy) in gonorrhea is explained and personal prophylaxis is fully discussed. Some decidedly unconventional but interesting views on gonorrhea are expressed in the last chapter, written by Mr. J. E. R. McDonagh, F.R.C.S., London. There is a thorough discussion of lesions of the verumontanum, upon which topic the author is especially well qualified to speak. The Wolbarst five glass catheter test for determining the source of pus and shreds in the urine is described and illustrated at length, as are also the methods of other urologists.

How to Make the Periodic Health Examination: A Manual of Procedure. By Eugene Lyman Fisk, M.D., Medical Director Life Extension Institute, and J. Ramsay Crawford, M.D., Assistant Medical Director Life Extension Institute; pp. 393, including an index and a bibliography. The Macmillan Company, New York. 1927.

The aim of this work is to provide the general profession with a method of conducting systematic physical examinations which will obviate errors and assure the detection of obscure but vital defects. It is an outgrowth of a smaller manual which for several years guided the Institute's examiners in their work. It is designed to serve both the specialist in this field and the practitioner who desires to improve his general diagnostic skill and technic. About thirty-one pages of the text are devoted to an epitome of clinical and laboratory technic, while about sixty-four pages are given up to counsellings of the examinee. Brief introductions to the various sections on regional examination are written by specialists, the intent of which feature is to keep matters in proper perspective. Various data germane to the subject are covered in an appendix of seventy pages.